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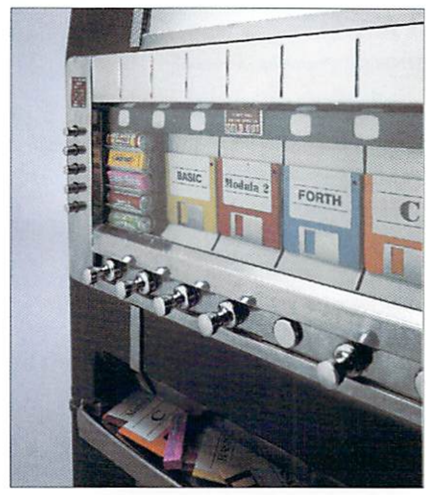


All photos actual unretouched Digi-View pictures shot directly off the 1080 Amiga monitor.

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VOLUME 4, NUMBER 10 OCTOBER 1988

CONTENTS



Not every lever on our cover (above) will provide the right choice when it comes to deciding which programming language is right for you. Some perfectly fine implementations of popular languages just plain don't fit—or at least don't enhance—the special capabilities and unique operating environment of the Amiga. Which languages best suit both your development needs and the computer you've chosen to develop with—these are the questions we'll be addressing this month in our special tour of high-level languages for the Amiga.

FEATURES

ARTICLES

COLUMNS

DEPARTMENTS

Vending machine courtesy of
L&M Amusement & Vending Co.

COVER PHOTOGRAPHED BY PAUL AVIS

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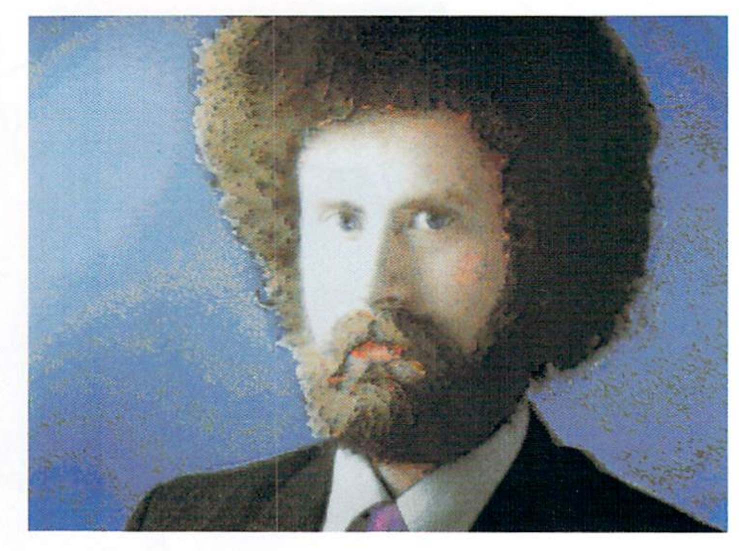
ZEITGEIST

Apart from AmiExpo, nothing has happened in the Amiga market over the last month.

I'VE ALWAYS WANTED to write that. Every time you pick up a copy of an Amiga magazine (or any other computer magazine), the editorial page always starts out by saying something like "Boy, it sure has been an exciting few weeks around here" or something exuberant like that. I've even written a few lines like that myself in the past. Well, to be honest, not a whole lot went on this past month.

"I thank you for the standing ovation, the gifts, and all the lovely vegetables."

There weren't any general computer shows. Commodore didn't announce any new products, they didn't ship any of the products that they've already announced, and they didn't fire a slew of top executives. No new viruses, no new technological breakthroughs, not much of anything. I'm sure that I'll get some flack from some marketing director about the press release they sent me. Their newest version 2.3.9A-27 of their LISP object code level debugger with built-in blackjack odds calculator that is just going to sweep the Amiga market. Didn't I think that was something major? And what about the NECROM '88 show in east Anaheim? The Amiga was a quasi-hit there with all the dembroniologists. Doesn't that rate coverage? Or what about Commodore's new "Two for One-and-three-quarters" deal for secondary school special education nutritionists in Newfoundland? (Part of their Commodore-Goes-to-School marketing plan.) Buy six Amiga 500s, four PC clones and a VIC-20 and they give you two copies of GraphiCraft at a 12.5% discount.



I should mention that AmiExpo was a great success. Lots of developers showed lots of wonderful products. Many Amiga fans attended and enjoyed themselves. R.J. Mical and I gave wonderful keynote speeches. My talk centered around what the Amiga users want for the future. I got some good suggestions. People want everything that Commodore has promised over the past few months (68020 board, PVA, bi-sync monitors and 1.3), a laptop Amiga, documentation written in something resembling English, and an idea I hadn't heard before, a cross between an Amiga 1000 and 2000 (a 2000 that only has Amiga slots, none of these MS-DROSS slots).

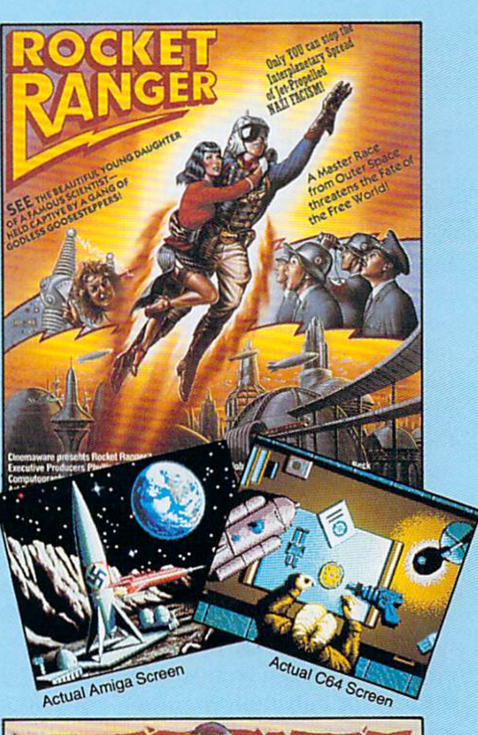
Since the other Amiga publications cover each of these events in scrupulous detail and yet somehow manage to omit the fact that sometimes I give speeches too (obviously it just slips through the cracks somehow), I will say that the keynote speech that I gave was absolutely wonderful, informative, stimulating, erudite, witty, poignant, insightful, fun, and in general a speech not to have been missed. If you missed it, then I suggest that you go back in time the way you came and make a point of going so that you will not have missed it. Or something like that. If you were there, then I thank you for the standing ovation, the gifts, and all the lovely vegetables.

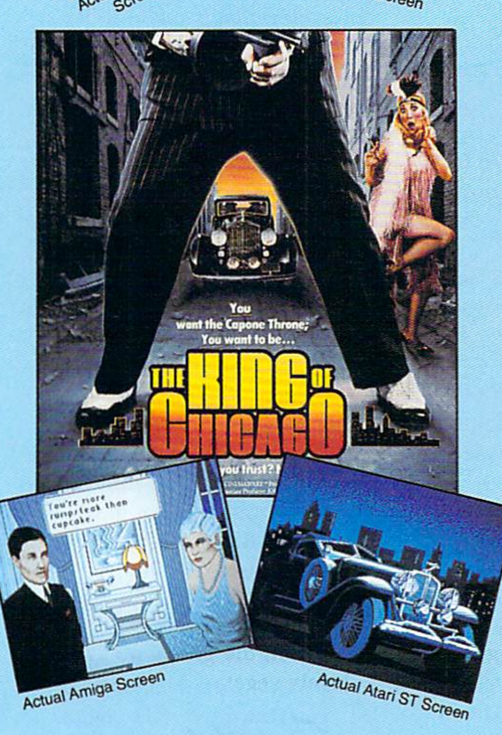


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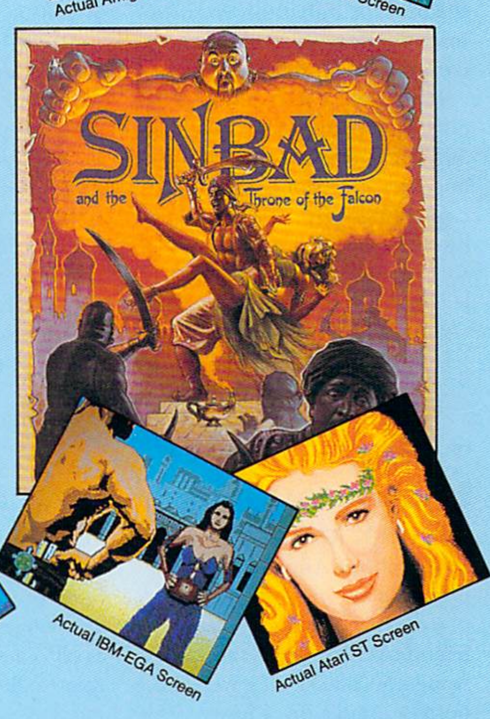












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REPARTEE

Comments, complaints, and concerns from AmigaWorld *readers.*

DISGRUNTLED

SINCE PURCHASING MY Amiga 500, it has been nothing but trouble. First, the power supply blew up. Second, the disk drive had a problem differentiating between write-protected and non-protected disks. Now there is a bad video connection so that the interlace mode works only intermittently.

The quality-control department at Commodore must have been asleep when my machine went by. I wonder if Commodore knew something that we didn't when they guaranteed the unit for only three months instead of one year like other computer manufacturers.

It's a shame that such a wonderful machine as the Amiga 500 is going down the drain because of a simple quality-control problem. Maybe Commodore should heed the lesson that the U.S. auto industry learned when it let quality slide.

Alex H. Young
Cambridge, MA

TO ERR IS UNIVERSAL

I'VE BEEN READING all these letters about Amiga 500s breaking down, chips not in place, etc. Give me a break! A friend and I recently bought Amiga 500s and they were in perfect condition. I have owned a C-64, a C-128, and now an A500. I still have the C-128 and have never had any trouble; the only trouble I have had is with non-Commodore equipment. I know other people with Commodore computers who have never had any trouble.

Close to here, there is a computer store that sells Amigas, and they have five machines going every day. They have never had any trouble with them, nor has anyone returned one. I know quite a few people who have bought IBMs and Apples and have had trouble with them. I know a person who bought a Mac SE before the Amiga came out. When he first got it home, it didn't work; Apple forgot to install the RAM chips. The company replaced it, but he still had problems. Finally, he bought an Amiga 1000 and has had no problems with it.

Everyone makes mistakes, including IBM, Apple, and Commodore. I don't think Commodore is any more careless than other companies.

Chad Kielkopf
Sturgis, MI

S.M.I.L.E.!

SLANDEROUS! I FIND it difficult to believe that someone open-minded enough to use an Amiga could be so ignorant as to blame Dr. Leary for drug-related deaths. Having read almost everything he's published, I feel qualified to say that what he advocated was drug use, not abuse. Furthermore, he no longer advocates such practices.

In the late '60s and early '70s, lots of us did things we wouldn't do now. Personally, I believe that LSD would have caused much greater damage without such guidance. For those who have never read anything by Timothy Leary, he advocates S.M.I.L.E. (Space-Migration-Intelligence-Life-Extension), a very noble cause to which I too am dedicated.

James E. Shaffer
Barcelona, Spain

HAPPY HUNTER

REGARDLESS WHAT people may say, *AmigaWorld*'s Summer '88 Treasure Hunt was fun—at least for me. The desire for a 2000 was more than enough to propel me to follow each clue.

Fred Gardner
St. Petersburg, FL

LOW-COST COLOR

I JUST READ Mr. Wright's call for a low-cost color ink-jet [Zeitgeist, June '88, p. 8]. I know of a solution (at least for some users). Xerox/Diablo is still selling rebuilt Diablo C150 color ink jets for around $450. The color is wonderful, handling 4,096 shades. The only drawback is speed. In text mode, 25 cps is flying.

Essentially, the Diablo C150 is a direct predecessor to the Xerox 4020, with (as far as I know) the same features and resolution. They're similar enough so that you can use the Diable C150 printer driver on the Xerox 4020 with good results.

At any rate, if you're willing to wait for printouts, a rebuilt Diablo C150 may solve your problem.

R'ykandar Korra'ti
Lexington, KY

ERRATA

IN THE JUNE '88 Notepad ["State of the Union Jack," p. 14], reference is made to the release of Bubble Bobble by British Telecom. British Telecom has been licensed by Taito Software to release this game in Europe *only* for the PAL Amiga.

Regarding the sidebar to "Workstation Amiga" ["Like a Hurricane," August '88, pp. 30–31], Ronin Research and Development, Inc. is the developer and manufacturer of the Hurricane line, not Finally Technologies. All inquiries regarding the Hurricane board should be addressed to: Ronin Research and Development, Inc., 1150 Ballena Blvd., Suite 201, Alameda, CA 94501. 415/769-9325.

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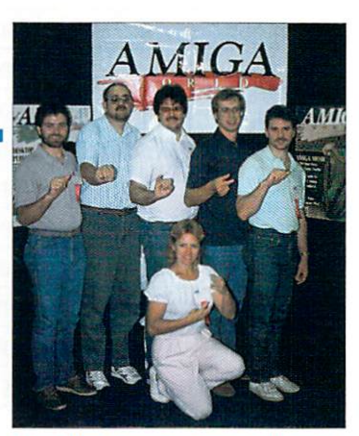
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NOTEPAD

Compiled by Linda Barrett

Cake, Ice Cream, and Computers



No matter how you spell it, it reads "*AmigaWorld*."

THE AMIGA'S THIRD birthday party, sponsored by AmiEXPO and *AmigaWorld*, was one of the highlights of AmiEXPO-Midwest, held last July in Chicago. Choruses of "For she's a jolly, good computer" rang throughout the exhibition hall during the keynote sessions and seminars.

Wishing the guest of honor much success in her fourth year, Jeff Porter, Commodore's Director of Product Development, led off the keynotes with a talk about products under development at Commodore. He outlined the improvements to the operating system under version 1.3 (which may be an indication that 1.3 will be available fairly soon). The enhanced chip set for the A500 and A2000 will require the 1.4 system software, which Porter said will be ready by the beginning of next year. He also discussed the **2286 Bridgeboard**, an IBM PC/AT on a card that allows you to use the mouse in the PC environment. Other products that came up in the discussion were the **2058 RAM Card** for the A2000 (2MB RAM, expandable to 4 or 8MB), the **2620 Card** for the A2000, the **A2024 Monitor** (1008 × 800 display, works on all Amigas with 1MB RAM), the **A2300 Genlock**, the **Professional Video Adaptor**, and the fabled **Transputer** board. Lest you get too anxious, Porter said that most of these products are in Beta testing and that the Transputer is "a long way off."

Out on the floor, developers had plenty of party favors for the guests. The bulk of new products that were introduced emerged in the video field. Elan Design demonstrated their **Invision** video-processing system. Invision works with A-Squared's Live! video digitizer to turn video from a VCR or camcorder into moving Amiga graphics. Communications Specialties announced the **Gen/One** genlocking encoder, compatible with all three Amiga models. Other new products for videophiles included: Syndesis' **InterFont**, a 3-D object font designer; Mindware's **PageFlipper Plus F/X**, a full-screen IFF image and special effects program; Creative Microsystems' **VI-Series** of multi-use video adapters for interfacing the Amiga with video hardware and peripherals; and Inner Connection's upcoming **C.A.V.E. Video Accessories.**

In the realm of graphics, Gold Disk introduced **Professional Draw**. Scheduled for October release, Pro Draw will be compatible with the next upgrade to Pro Page. Gold Disk also announced **SpectraScan**, a prepress color image processing package, which is also due out this fall.

Software Visions demonstrated **Microfiche Filer Plus**, a professional database featuring optional macro programming using the ARexx language. Emerald Intelligence hosted a champagne toast to launch **Magellan**, an artificial intelligence/expert system building tool.

Among the new games, the most eye-catching was Free Spirit Software's **Sex Vixens from Space**, an adult graphic adventure game. Mindscape's **Superstar Ice Hockey** looks like a winner. ReadySoft gets the weirdness award for **Scary Mutant Space Aliens from Mars**.

For hardware fans, Comspec Communications introduced the **SSD Hard Drive System** for the A500. The Comspec system consists of a SCSI host adapter and a hard-drive chassis; the SSD chassis will be available in several different configurations. Spirit Technology announced their **ST-506 Hard Disk Adapter** for the A500 and A1000.

Among the many guests who thronged the aisles were nine hearing-impaired Amiga users who were given VIP status by AmiEXPO's Alexander Glos. Registration fees were waived for guests with VIP status, which allowed the group to use those funds to hire an interpreter for the duration of the show. Steve Jacobs, Video Coordinator of AmiEXPO, handled the arrangements. Jacobs hopes that future AmiEXPOs will have full handicapped access.

Upcoming AmiEXPOs will be held in Los Angeles (October 7–9) and New York (March 3–5). For more information, contact Ami Associates, 211 East 43rd St., Suite 301, New York, NY 10017, 800/32-AMIGA.

—SL

Dark Side of Paradise

ON THE EERIE moonscape of Hawaii National Volcano Park, sprawled across a desolate hill, a couple of ramshackle buildings cling to black lava: the Hawaii Volcano Observatory. In this wasteland of sulfur, glowing lava, and burned-out craters, a team of 26 scientists is using the Amiga in an attempt to uncover the why's and what's of volcanos and earthquakes.

Near Hawaii's three liveliest volcanos, on the "Big Island," the observatory is currently using an Amiga 1000 for graphics processing, generating real-time maps of the island's seismic activity.

Dr. Carl Johnson and Dr. Tom English are responsible for the data processing of volcano and earthquake information. Sensors placed at 72 locations throughout the island transmit a stream of seismic information to the observatory. Each sensor transmits about 100 pulses per second, and each day more than 50 minor trembles are recorded, totaling about 15,000 per year. Fortunately, most are so minute that only the delicate seismic sensors register their presence. Radio receivers pick up the analog signals from the sensors and shoot them through analog-to-digital converters. The resulting digital information is then processed by two VAX-75 mainframes. A Fortran program analyzes all 72 streams of signals and transforms them to vectors describing the strength and distance of the tremor. A 1200-baud modem transmits the vectors to the Amiga, where they are used to plot a graphic representation of the quakes superimposed on a map of Hawaii.

Says English, "We needed something that could show us seismic activity in real-time. The Amiga was an obvious choice. Its multitasking lets us display several different kinds of information simultaneously. The VAXes crunch the numbers and the Amiga turns the numbers into something recognizable to the eye." The Amiga's graphic output is sent to laser printers to produce earthquake maps, seismic charts, and even lava-flow predictions.

The Amiga can also be put to work to monitor a volcanic eruption. Just prior to eruption, the volcano becomes swollen and heavy, as the molten lava intensifies pressure on the inside. The swelling is measured with a laser-tilt meter, and the weight of the lava is measured with a gravity meter. These results are sent to the VAX machines, then fed to the Amiga to create a window into the depths of a glowing volcano.



Mauna Loa vs. Amiga

Tourists at Hawaii National Volcano park can see the Amiga at work in the Volcano Museum next to the research center, where a single Amiga 1000 displays the map of Hawaii and lets you follow seismic events in real-time.

English and Johnson are at work on new algorithms aimed at predicting the direction of lava flow. Through the combined powers of the VAX and Amiga, the scientists can simulate volcanic eruptions and follow streams of binary lava as it flows down imaginary, computer-generated mountains. "As a result, we will become more capable of guessing the direction of lava flows and thereby avoiding dangerous situations," Dr. English emphasized.

"Dial an earthquake" is another service that could be based on English and Johnson's Amiga program. Results from seismic institutes around the world could be picked up by a central database and converted to Amiga IFF format. Any Amiga owner with a modem could connect to the database and have access to a reliable, and cheap, real-time earthquake detector.

English and Johnson plan on getting more Amigas. "We like the new A2000 model. It's impressive, and we need some of those," said an enthusiastic English.

—Soren Kenner

Job Hunting?

IS IT TIME to change jobs? With the Electronic Media Network you can flip through the classifieds section without a single smudge of newsprint on your fingers. Remote controlled by an Amiga 1000 and an A2000, the on-line service currently features around 80 classified employment ads, predominantly for high-tech positions. The 24-hour system presently supports four incoming lines, but will add between 16 and 20 as soon as it has 350 advertisers.

If you are satisfied with your employer, the network has plenty more to offer. You can contact other callers through E-Mail or teleconferencing. To share programming ideas, you can up- and download to and from a library, or set up a Special Interest section on the system. For advertisers, the network supplies a marketing survey service.

Anyone can access the classifieds section, but you must subscribe to the system to take advantage of the additional services. A five-hour subscription will cost you $15, but if you mention the word "Amiga" when signing up, you will receive an extra three hours free. The suggested modem settings are eight bits, no parity, one stop at 300 or 1200 baud. For more information, contact the Electronic Media Network data line at 216/241-2612 or a Network representative at 216/241-2600.

—LJB

HORS D'OEUVRES

Hints, tips, and techniques

from your fellow Amiga users.

Tiny Windows

THE CON: DEVICE has some obscure, little-known features. It is usually used to open custom windows, but when you "shrink" these windows with the sizing gadget, you're limited to a minimum size of 120 pixels wide by 50 pixels tall. However, if you open the window with a width or height less than these values, this becomes the smallest allowable size. Opening a 1 by 1 window allows the window to take on any size you desire. Of course, a window this small can be hard to find and impossible to work with. A way around this difficulty is to put the window in the extreme upper left-hand corner of the screen. Then, all you have to do to find it is move the mouse as far to that corner as it will go, hold down the left mouse button, and open it up. This hidden window is always there for you if you need an extra CLI, without taking up space on your screen when it's not in use. Add this line to your startup-sequence:

```
NEWCLI "con:0/0/1/1/Tiny-Window"
```

Now that tiny window will always be there when you need it.

Marvin Oldham
Oklahoma City, OK

Choices with SKIP

COMMAND SEQUENCE FILES (CSFs) such as the startup-sequence tend to be inflexible because you can't provide them with any information that will alter their execution sequence. However, the AmigaDOS input system for command templates (using ? as the parameter of an AmigaDOS command, prompting DOS for the parameters) provides a nifty way to vary the execution sequence of CSFs.

Specifically, the SKIP command used with the ? parameter allows you to enter from the keyboard a CSF label to which the SKIP command will skip. It's limited (the only thing this can do is vary CSF execution flow), but it's there and it's fairly easy to use.

The actual syntax is as follows:

```
SKIP > NIL: ?
```

When AmigaDOS executes this in a CSF, it pauses and allows the user to enter a label that it will skip to.

After this statement, enter LAB (label) statements that correspond to any possible responses that you want to accommodate. Here is a simple example:

```
FAILAT 11
ECHO "Want to? (Yes/Y, No/N,
  Maybe/M)"
SKIP > NIL: ?
LAB no
LAB n
ECHO "This is NO."
SKIP end
LAB yes
LAB y
ECHO "This is YES."
SKIP end
LAB maybe
LAB m
LAB
ECHO "Make up your mind."
LAB end
```

FAILAT helps limit damage in the event that the user enters a response that doesn't have a corresponding LAB. CSF execution would terminate at the SKIP statement, but at least you wouldn't get error messages.

The LAB with no parameter on the third-to-last line will catch the times that the user answers the SKIP ? with a blank Return (it makes for a quick default action path, too).

There is one other thing to consider. SKIP will only skip forward in a CSF, so loops aren't possible (short of recursively recalling the CSF. . .but that's another matter entirely, if it even works). It also means that LABs are reusable from SKIP ? to SKIP ?. Each SKIP will skip to the next LAB statement that matches its parameter. In other words, you can have several LAB y's or LAB n's. And incidentally, uppercase versus lowercase is not a factor in the LAB parameters or SKIP key-ins.

John L. Schuncke, Jr.
Bellevue, NE

500 Monitor Stand

THE AMIGA 500 is a great machine, but unlike the 1000 or 2000, you can't rest your monitor on top of the computer. For those of you with limited desk space, Radio Shack has the answer. For $30, the all-metal monitor stand for the Radio Shack EX computer is a perfect fit.

Michael Bernard
Wenatchee, WA

The Guru Speaks

THE FOLLOWING IS a short Amiga Basic program that lets the Amiga Guru speak to you. Notice that it uses PEEK—this message does actually exist in your Amiga ROM, in the Write Control Store (WCS), where your Kickstart disk is loaded. You must run this program under version 1.2 of the system software. The location of the message changed between versions 1.1 and 1.2. Be very careful when typing in the program—the PEEK locations are extremely important. To make the message sound better and look better, I forced an exclamation mark to appear at the end. This doesn't appear at the end of the message in ROM (no punctuation does). The pro- ►

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gram will alter the voice somewhat to make it sound more omnipotent. Enjoy!

```
10 'Amiga ROM Message—the guru
   speaks
20 '
30 CLS : s$ = " " : SAY
   TRANSLATE$(s$)
40 FOR i = 0 to 8 : READ voice%(i) :
   Next i
50 FOR i = 16281592& TO 16281632&
60 s$ = s$ + CHR$(PEEK(i))
70 NEXT i : s$ = s$ + "!"
80 LOCATE 11,18 : PRINT s$
90 SAY TRANSLATE$(s$),VOICE%
100 '
110 DATA 65,0,150,0,20078,64,4,0,0
```

Greg Epley
Lexington, NC

Editor's Note: The line numbers are optional. We have included them here for clarity.

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Ron Skinner
San Bernardino, CA

TWO C TIPS

1. IF (LIKE ME) you are too lazy to type an L after all numbers you pass to the Amiga Libraries with Aztec C, and you don't care if your programs run a little larger, then drop the L and add a +C to your compilation command (e.g., "cc ProgramName +C"). This will force the Manx compiler to create all "int" variables as longs. "Shorts" are unaffected.

2. I recently wrote a program that used a very large array, 2000 elements of 25 character strings. The program would occasionally cause the whole system to crash, giving me a Guru Meditation error. The problem turned out to be that all variables (including those in the main( ) section) are created as automatic variables, unless specifically declared as static. Automatic variables are created on the system stack; mine is 8000 bytes long. Creating very large arrays can cause a stack overflow, which makes your program die at an apparantly random point with a software error and the Guru Meditation message.

There are two solutions to this problem. The first solution is to declare large arrays as static (e.g., "static char VariableName[2000][25]"). This is acceptable, but the compiler will store your variables in the data section of the machine, which is larger than the stack, but not excessively large. A better way to solve this problem is to use the malloc or calloc subroutines to allocate space for your variable names. These routines allocate space in the system "heap," which, as the name implies, is huge.

Peter A. Phelps
Glenview, IL

If you have an idea you'd like to share with our readers, send it to Hors d'oeuvres, AmigaWorld *Editorial, 80 Elm St., Peterborough, NH 03458. If your idea gets published, you'll receive an* AmigaWorld *surprise gift.* ■

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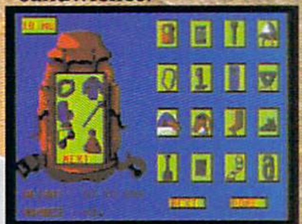
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REVIEWS

ASSEMBLERS: PUTTING IT ALL TOGETHER

Seven tools vie to help you become a master of assembly.

By Bryce Nesbitt

THOSE SOULS BRAVE enough to dive into the wild and woolly world of assembly-language programming may come up confounded. At least seven programs make up the Amiga assembly puzzle.

Unlike jigsaw pieces, size, shape, and color will not reveal each assembler's placement in the picture. To expose strengths and weaknesses, I subjected the programs to rigorous testing: actual use on a large assembly project. About once a week the project source code was dragged, often kicking and screaming, to the next assembler in the lineup.

I made note of each bug I encountered. A tool that has bugs will eventually eat up some of your work, and worse yet, it might insert subtle flaws into your code.

Surprisingly, not all the assemblers are compatible with Commodore's standard include files. (These files contain the constants and structure definitions that make the Amiga tick.) Without this information, it is, quite simply, impossible to write Amiga-specific programs.

MACRO ASSEMBLER 10.178 AND 11.0

The Macro Assembler, by Metacomco, is noteworthy because it was the first and, for a long time, the only assembler for the Amiga. Thus, it became the standard. To this day Commodore uses the Macro Assembler for developing new Kickstart releases; all include files were written specifically for Metacomco's assembler.

With such an important role, it is fortunate that the Macro Assembler is quite good. It closely follows the specifications set by Motorola, the manufacturer of the 68000 chip. Sensible extensions to the Motorola specification are included to make programming easier.

The Macro is, however, slow; it flops out of the gate at a dead crawl. Also, it has not kept up with the times; 10.178 comes with include files for the obsolete Kickstart 1.1. This assembler needs a bit of updating to compete today.

Metacomco's new version, 11.0, is more than twice as fast as 10.178. Unfortunately, this release includes a cavalcade of problems and errors.

The documentation is riddled with inaccuracies and omissions. The Alink linker is a complex and crucial part of the assembly process—it is impossible to produce a working program without it—yet not a single page of the manual mentions Alink. On one hand, many useful features of 11.0 are not even listed, while on the other, 18 pages are devoted to a text editor that is not included in the package. One of the examples will not assemble without major changes. The include files have not been updated from Kickstart 1.1, and a new bug prevents them from assembling in version 11.0.

The potentially very useful " – e" option will not work under this version either, so it's just as well that the 11.0 documentation does not cover it. Even if you disable assembly with a conditional directive (such as "IFEQ"), macro expansion continues. This means that you cannot incorporate some include files twice. Deep nesting too many includes will blow the assembler's stack without so much as a warning, and "ASC.L (AO)" is not flagged as an error.

The instructions on how to get started are inadequate; unless you are already an expert Metacomco user, you probably will not have any luck with this version. Metacomco did not respond to my questions about the problems; both paper and electronic mail went unanswered.

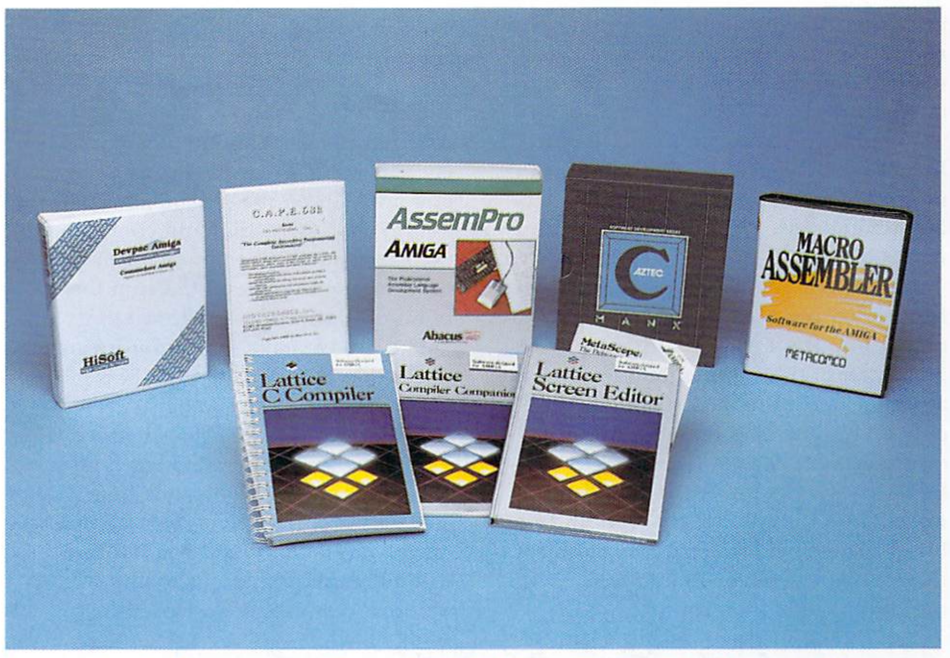
DEVPAC AMIGA

Devpac is a unique, thoughtfully-engineered package. It includes an integrated editor/assembler, but also offers the option of a stand-alone CLI version. It can turn assembly directly into a normal executable file. It can also produce a linkable module, or even direct absolute code (useful for burning ROMs, or patching existing code). Despite the fact that Devpac was ported from the Sinclair QL and Atari ST, it shows little or no stigma.

The disk includes quality examples to get you started, although an additional example requiring data to be directed to chip RAM would be most welcome. The manual offers hand holding for beginners (although the tutorial on how to use the CLI aims a bit low). Experts can conveniently skip through it.

Devpac is free of rough edges and awkward features. Error handling, for instance, is graceful; after assembly, you simply hit the right-Amiga and J keys to access the next line with an error.

The MonAm debugger, like the rest of the package, is tiny, fast, and efficient. It can read in debug hunks produced by other assemblers, trap Gurus, single step code, and examine registers and memory. While additional tracing options (such as "slow run") and expression evaluation would be appreciated, MonAm is up to the task. I have only two complaints. First, it cannot take advantage of large displays because its screen size is fixed. Second, on the A500 and 2000, the search function crashes if it does not



Hamming it up for the camera are: Devpac, CAPE 68K, AssemPro, the Aztec C compiler, Macro Assemblers, and the Lattice C compiler (with professional accessories).

find what you asked for.

While I found absolutely no bugs in the assembler, the current Devpac version has several major limitations. All are clearly and honestly spelled out in the manual. Among the important ones is an inabililty to support local labels, which hurts. Also, labels may not be longer than 16 characters. This is awkward because some Amiga ROM calls have long names, but Devpac compensates by renaming them. Although only one SECTION directive is allowed per file, this is tolerable because you can split your work into multiple files. Lastly, the editor's work space does not expand dynamically as more text is entered, and you can edit only one file at a time.

CAPE 68K

CAPE 68K comes with a built-in editor that can act either as a tripped-down EMACS or a WordStar clone. The editor does not dynamically adjust its text buffer size when text is added, although there is a capability for editing files larger than the buffer. Other than pull-down menus, no Amiga features are used; you cannot even point and click to move the cursor. You can save the entire configuration of the editor and assembler to a file with a single command. Except for the fact that you can edit only one file at a time, CAPE's editor is easy and pleasant to use.

A unique feature of CAPE 68K is an ARexx-style message port. ARexx (William S. Hawes) program owners can write programs to control the editor and assembler remotely.

The assembler is nearly 100% compatible with the Metacomco standard, and goes well beyond that. Converting programs written for other assemblers will be easy. CAPE has more features than any other contender. One particularly nice option is MACFILE, which works just like INCLUDE, but realizes that most include files need to be looked at only on the first pass (all the others read each include file twice).

CAPE 68K supports a healthy set of optimizations, including just about everything except changing forward-long branches to forward-short. CASM, the same assembler without an integrated editor, is included on the disk.

The editor crashed twice during the testing, and displayed a few other minor glitches. The assembler fails to flag an error if you attempt mulu.l. The –o command-line option does not work; a specific OBJFILE directive must be included in the source. Inovatronics' generous upgrade policy allows you to simply exchange your master disk for the latest version (an update is due out by the time this is published).

Lattice Asm

Version 4.0 of the Lattice C compiler comes bundled with an assembler. It is clear that this is intended primarily as a support tool for the C compiler, and not to stand alone.

Asm is just barely Metacomco-compatible enough to deal with most of the standard include files, although some do not assemble properly. Macro support is incomplete. There are no temporary variables, instruction variants such as bchg.b are disallowed, and Asm doesn't support such important assembler directives as EQUR. Converting standard examples generally requires tedious work.

On the positive side, Asm gives you excellent control over selective placement of sections in chip or fast memory. As expected, the capabilities of Asm complement the Lattice C compiler; Asm can create base-relative code and data for later manipulation by Blink. The Lattice assembler is the only one that comes with a full, commented set of the newest include files (I am of the opinion that all serious programmers should own a set).

Documentation, however, is terrible. There are a few scanty pages that do not even touch on some of the most important features. The complex and critical CSECT directive receives no coverage; there is no mention of the –u option required to assemble examples on disk.

Specifying a large number of registers in a MOVEM instruction produces incorrect code and corrupts memory. Attempting to use a binary constant such as "label equ %1011" produces incorrect code. The CNOP directive is broken and can cause bad code, and Asm will smugly place word and long-word data on odd boundaries without warning.

Aztec AS

Manx's Aztec C compiler produces code by first translating to 68000 assembly and then assembling the result; thus an ►

assembler is resident in the program. In recent versions, this assembler has been upgraded to the point where it can stand on its own.

Metacomco compatibility is good. It handles the standard include files with no problems, and you can coerce it into assembling most source code with only minor hassles.

Aztec offers the best code-optimization features of any of the packages. The program optimizes forward and backward jumps, jump subroutines, and branches, as well as moves to data registers. The only real problem is that Aztec uses its own object-file format. This effectively locks Aztec users into their own little world. The Aztec linker has options to bring a subset of standard Amiga object files in; the assembler should have an option to put such files out.

Any DCB.B instruction with more than about 160 elements produces incorrect code. With moveq, it is impossible to take the length of an area; for example, "moveq #endcode-startcode,d0" will not work. Even with optimization off, some code sequences are still optimized; this sin is hard to forgive.

AssemPro

AssemPro has one unique feature: if it encounters an error during assembly, a box pops up on the screen, allowing you to type in a correction and continue. It's even nice enough to automatically update the file in the editor. From this point onward things go downhill.

The fundamental problem with AssemPro is that not enough effort was put into porting it to the Amiga. AssemPro combines a tightly-integrated editor, assembler, disassembler, debugger, and quick-reference utility in one huge program, an approach held over from the Atari ST version. When you boot up AssemPro, all four major modules open windows that cannot be closed separately.

The editor is painfully slow and so buggy that the authors of the manual found it necessary to mention at least one defect in print. AssemPro crashed 37 times before I stopped counting. By working slowly and avoiding sudden moves, it is possible to get things done. Possible, but not pleasant.

There is no way to automate the assembly process. AssemPro won't take arguments from the CLI. In orde. to use AssemPro, you have to load the whole ball of wax. The assembler does not conform to the Metacomco standard, or to the more elemental Motorola standard. I was unable to find a single source file in my collection that would assemble without changes. AssemPro cannot read the standard include files; a heavily-edited custom set is on disk. Already these includes are obsolete, and, worse yet, the editing job is imperfect.

The debugger is the high point of the package. It is reasonably capable and has a natural feel. Unfortunately, it has difficulty fitting into the Amiga environment; it cannot read standard debug hunks, and common multitasking situations cause it to lock up.

AssemPro would benefit greatly if all the modules were unbundled into separate multitasking modules, and more at-

Continued on p. 76

Comparative Features of Seven Assemblers

	Metacomco 10.178	Metacomco 11.0	CAPE 1.0	AssemPro 1.0	Lattice 4.0	Aztec 3.6	DevPak 1.2
Base relative code	N	N	Y	N	Y	Y[1]	N
Linkable code	Y	Y	Y	N	Y	Y[1]	Y
Direct to executable	N	N	Y	Y	N	N	Y
Absolute code	N	N	Y	Y	N	N	Y
68010 processor	N	N	Y	Y	N	Y	N
68881 floating point	N	N	N	N	N	Y	N
68020 processor	N	N	N	N	N	Y	N
Optimize backward branches	Y	Y	Y	Y	Y	Y	N
Optimize forward branches	N	N	N	N	N	Y	N
Debugging symbols	Y	Y	Y	N	Y	Y[1]	Y
Debugger at base price	N	N	N	Y	N	Y	Y
Speed (in seconds)[2]	60	16	16	33	41	19	10
Temporary labels	Y	Y	Y	Y	N	Y	N
Listing flexibility	excellent	excellent	good	excellent	fair	fair	good
Chip vs. fast control	N	N	Y	Y[3]	Y	Y[3]	Y
Estimated compatibility[4]	100%	98%	99%	5%	60%	90%	85%
Documentation	good	poor	fair	good	poor	good	good
Minimum working size	103K	107K	50K/140K[5]	146K[5]	99K	91K	21K/33K[5]

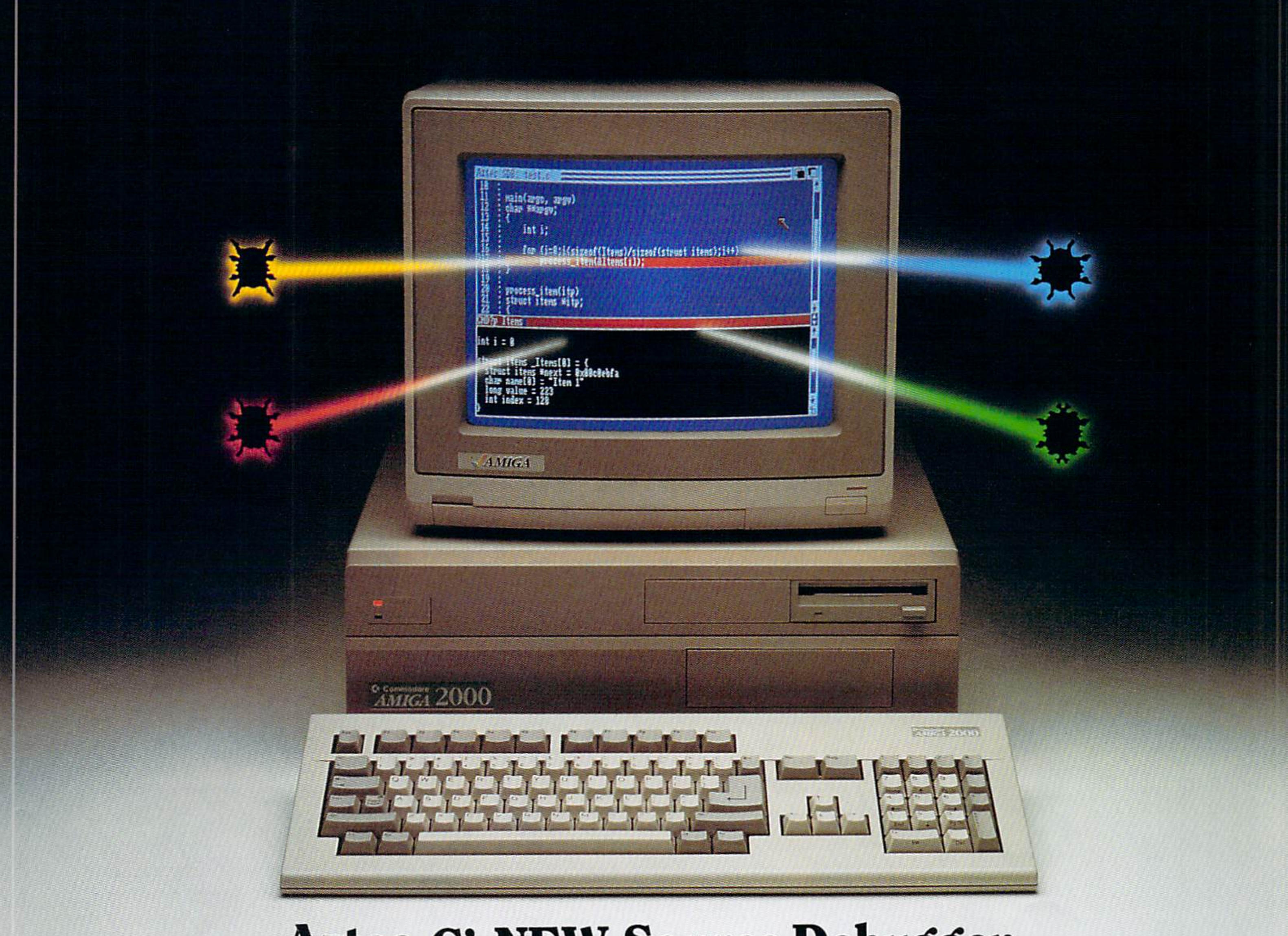
[1] Uses a custom object file format.

[2] The same test file was used to clock assembly speed for each package.

[3] Uses an "all or nothing" approach; either your entire data segment gets placed in chip, or none of it does.

[4] With Metacomco standard.

[5] An integrated package that can stay loaded in memory.



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BASIC By The Numbers

We interrupt this tutorial for a special announcement about tools that make your Amiga Basic programming faster and easier. We will return to our regularly scheduled column next month.

By Bob Ryan

51 Tooling Around

AT ITS CORE, programming is the art of identifying a problem, creating a method to solve the problem, and coding the solution in a language that the computer can understand. Although not the most creative part, the third stage of the process is often the longest and most difficult because program coding requires that you have sufficient knowledge of the machine and language system you are using. Many creative people with good programming ideas never develop them simply because they cannot or will not learn the technical minutiae required to produce good code. Some commercial tools take a lot of tedium out of code generation. Here, I'll tell you about the ones I use to help me develop good code fast and develop good fast code.

52 Matters of Interpretation

Amiga Basic is an interpreted language: The program statements you enter into the list window are translated into machine code and executed one at a time when you run the program. Even if a statement is in a loop that executes 10,000 times, the statement is still translated each time through the loop. Interpreters are inherently inefficient.

The advantage of an interpreter over a compiler (a language translator that converts your entire program into machine code, then executes the machine code only) is that an interpreter provides a friendlier programming environment. To run an interpreted program, you simply tell the interpreter to run the current program. Developing and debugging code is much easier with an interpreter than with a compiler.

The best of both worlds would be to have an interpreter and a compiler that understand the same language. Amiga Basic programmers have the best of both worlds. With minor and well documented exceptions, the code you write with the Amiga Basic interpreter is compatible with the Absoft AC/BASIC Compiler ($195 from Absoft, 2781 Bond St., Auburn Hills, MI 48057, 313/853-0050).

The combination of the Amiga Basic interpreter and the Absoft compiler is better than the sum of its parts. I develop my programs with the Amiga Basic interpreter, which gives me access to the interpreter's built-in degugging tools. When my program is finally written and debugged, I save the program file and load it into the AC/BASIC compiler. I then have the compiler translate the Amiga Basic statements into fast, standalone machine code. I get the ease of development provided by an interpreter and the speed of compiled code. AC/BASIC is nearly indispensable; I recommend it to all BASIC programmers.

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53 Point and Click Coding

Supporting both Amiga Basic and the Absoft compiler, PowerWindows 2.0 ($89.95 from Inovatronics, 11311 Stemmons Freeway, Suite 7, Dallas, TX 75229, 214/241-9515) automatically generates program code to handle complex Intuition functions such as gadget and menu creation.

The unique aspect of PowerWindows is how you indicate the program code you want it to produce. PowerWindows uses Intuition menus and requesters to accept your input and displays the results of your selections immediately. You can either modify your input, generate the code that will produce the desired results, or save your instructions in an intermediate file. The new version of PowerWindows contains a Convert program that takes PowerWindows intermediate files and converts them to Amiga Basic code.

PowerWindows 2.0 is certainly the easiest code-generation program I have ever used, but it is not for everybody. The Amiga Basic code it generates is complex. More importantly, PowerWindows does not provide a bridge between Amiga Basic window I/O statements, including graphics statements, and the screens and windows that the PowerWindows code creates. As a result, you cannot use simple Amiga Basic I/O statements such as LINE, CIRCLE, and PRINT to write to a PowerWindows-generated output window. I/O using PowerWindows code must use the ROM Kernel routines directly. Although generating code with PowerWindows is a snap, incorporating that code into your Amiga Basic programs will be impossible without a working knowledge of the ROM Kernel text and graphics drawing routines.

PowerWindows is a superb utility, but it is most useful to programmers who are already immersed in the intricate world of the Amiga ROM Kernel, such as those using C, Modula-2, and assembly. The only BASIC programmers who should go near it are those who are interested in accessing the ROM Kernel directly without having to learn the syntax of another language.

54 Yin and Yang

Extend ($39.95 from SunSmile Software, 533 Fargo Ave., Buffalo, NY 14213, 716/885-5670) is both harder and easier to use than PowerWindows 2.0. Extend is a library of 33 commands you can access from Amiga Basic. As the name implies, the library extends Amiga Basic's command set.

The Extend commands let you add Intuition gadgets and requesters to your Amiga Basic windows. They also provide you with a file requester and a way to run any Amiga program from within an Amiga Basic program. Altogether, Extend adds a lot of power to Amiga Basic.

Using some Extend functions is a little more involved than most BASIC programming. For example, to use the GADGET function (for creating Intuition gadgets) you must set up an array that contains the attributes of the gadget and then pass the address of the array to the function. Although not very difficult, this type of programming will be new to most BASIC programmers.

The best thing about Extend is that you can tie its functions into Amiga Basic programs. The gadgets you create with Extend can be attached to your Amiga Basic windows, allowing you to draw and print in these windows with Amiga Basic commands while taking advantage of the Extend functions. Extend is a tool that intermediate BASIC programmers should investigate.

55 Creative Copying

One of the best ways to cut down on program-development time is to avoid reinventing the wheel. In the Amiga public domain, you will find scores of Amiga Basic programs that you can use and modify to your heart's content. I suggest you get a couple of public-domain Amiga Basic disks and examine their programs. I often extract interesting and valuable routines from public-domain software and include them in my own programs. Oftentimes, writing a program consists of little more than combining a series of routines like beads on a string. The challenge of programming, after all, is not in the actual coding, but in defining the problem and coming up with an algorithm to solve it. Don't be afraid to use other people's code. It's not called the public domain for nothing.

56 Closing the Toolbox

Those are all the Amiga Basic tools I use regularly. You can find out more about these products by contacting their manufacturers directly. Until next time, direct your questions and comments to BASIC By The Numbers, AmigaWorld, *80 Elm St., Peterborough, NH 03458.* ■

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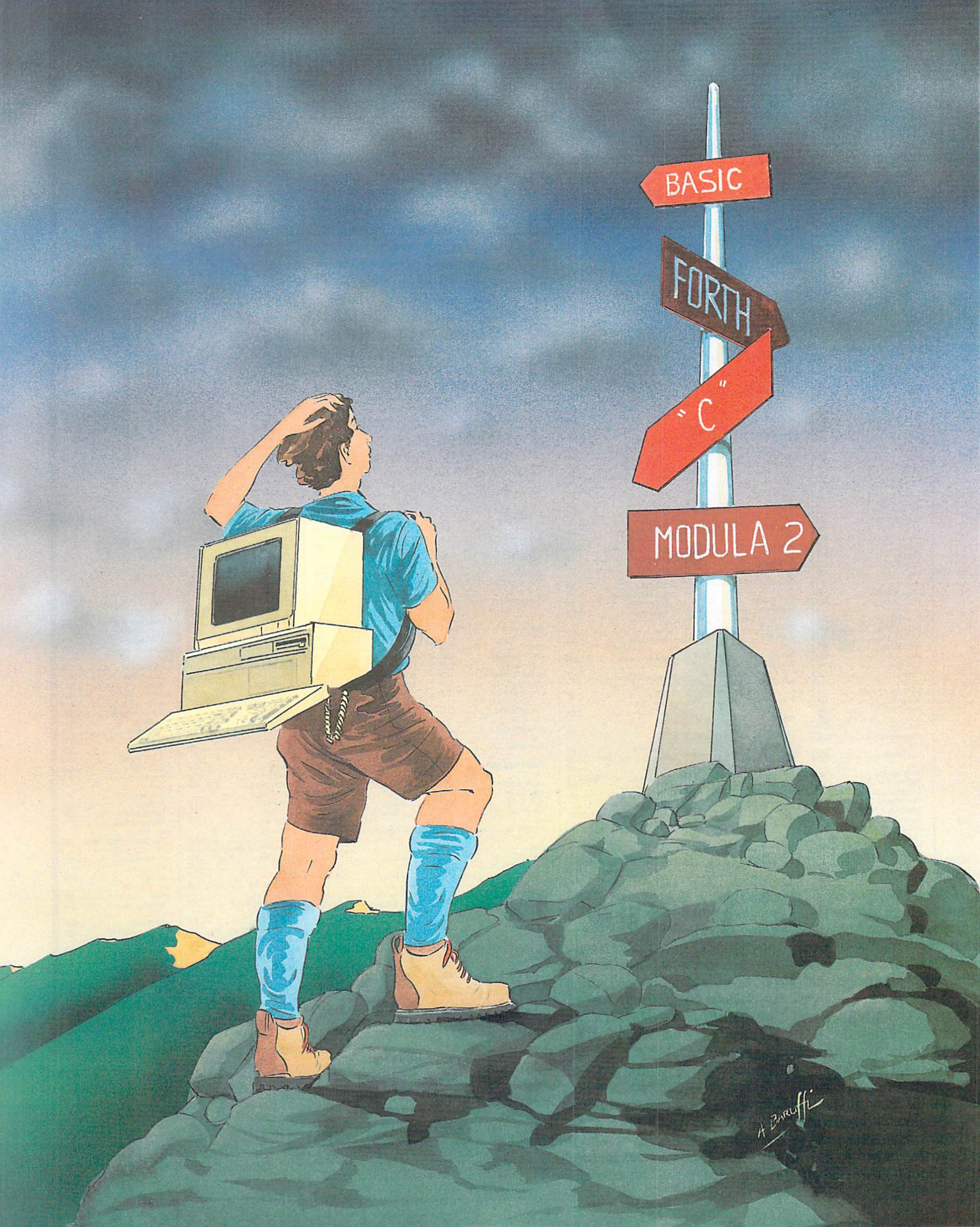
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Amiga Spoken Here

This "Baedeker's Guide" will prove invaluable to any programmer traveling the multitongued regions of Amiga high-level languages.

By Martin Murray

HAVE YOU EVER bought an Amiga language expecting to be able to make your computer stand on its head and giggle, only to discover that the language wasn't originally for the Amiga at all? Maybe it was developed for some *other* computer and "translated" to run on the Amiga. Perhaps it was a public-domain language compiler (like Meta or Small C) that runs on every computer and doesn't know the difference between Intuition and foresight. If your experience has been anything like mine, you know that not all Amiga languages were created with the Amiga's special capabilities in mind—and even some that were seem documented for professional mind-readers rather than beginning or intermediate programmers.

Let's start by asking three basic questions about languages. The answers to these questions helped me determine what to include in this tour of Amiga high-level languages.

• How well does the language provide access to the Amiga's ROM Kernel functions (the routines that make windows open, menus appear, and so forth)? A language that provides adequate access to these system calls should be able to create just about any kind of Amiga software.

• Is the language, or the particular implementation of the language, easy to use and easy to program in? Remember, you do your programming (which may involve a considerable amount of time) in the environment provided by the language maker, so you need a language that is flexible and reasonably fast.

• Finally, and most importantly, how easy is the language to learn? What is the learning curve? If you want to experiment with several languages, your range of experience may be limited if your choices require years of effort to master adequately.

Questions of compilers vs. interpreters, code size, and execution speed are not the most important criteria. My purpose here is not to contribute to the wars between the various language vendors, but rather to let you know what you are in for when you choose to develop with a particular system. Do not look for recommendations about which compiler is the fastest or whose output code is the smallest. Instead, we will examine our languages in terms of convenience, environment, and intelligibility.

Only languages that have significant support for the Amiga's special functions are discussed here. Not every language meeting this citeria is covered, so do not assume that because a language is not included, that it cannot generate Amiga-esque software. I have included only the packages with which I have a first-hand working knowledge.

C Language

C is the original Amiga high-level development tool; many sections of the Amiga's operating system are ►

ILLUSTRATED BY ANDREA BARUFFI

written in C. Although Modula-2 is now mounting a serious challenge, C is still the most popular language among Amiga software developers.

Just about any machine manipulation that you require is within your reach with C; the code it generates is fast enough to handle many important, time-critical activities. The drawback to programming in C, however, is that its style is not simple to understand. Text layout is completely free-form and most function names are less than intuitive. Many C programmers tend to use short, cryptic variable names; most likely, they would be less than open to suggestions that a few descriptive comments might be in order. The old joke goes that the C notation for "terse" is "trs." Learning C is not easy, but it is worthwhile.

There are two fiercely competitive C implementations for the Amiga: Lattice C and Manx Aztec C. Both supply all the files you need to program the Amiga, but neither package will teach you how to program in C. You may need some hefty reference material for assistance, along with a lot of messing around and looking at other people's code.

Manx Aztec C

If the whole idea of writing software in C frightens you, this package will do little to allay your fears on first perusal. Although very complete, the manual is large and difficult to navigate. The simple addition of plastic dividers to group the various sections would go a long way toward helping the novice programmer who must constantly refer to the manual.

The Manx system allows you to write code for four distinct "memory models." Put simply, these allow you to control code and data-area sizes with a high degree of flexibility, but they are also a bit bewildering in their complexity. Stick it out, though. This is really a very efficient C compiler. The manual contains several very good example-program files and even a chapter on C programming style.

The programming environment is really geared entirely to CLI use. A typical programming cycle would go like this:

1. Load your favorite text editor and your C language source file.

2. Edit your file and save the changes. Exit the editor if you have less than 1MB of RAM.

3. Run the Manx compiler, giving it the name of your source file.

4. Note any errors that the compiler generates. Re-edit if necessary to correct these.

5. The Manx assembler will automatically start and assemble the output from the compiler (your C source is translated into assembly language by the compiler).

6. Finally, link the program with the Aztec C support libraries (a library in this case is a collection of subroutines) using the supplied linker into an executable Amiga program.

7. Run the program, noting anything you still want to do to it. Go back to step 1 until your software is perfect.

Aztec support of the Amiga's capabilities is very complete. You can call any of the Amiga's ROM Kernel functions just by naming the function and the parameters that it accepts. During the linking phase, the needed "glue" routines are read in from the Aztec libraries. (A glue routine is a small subroutine that will make sure that all 68000 CPU registers are properly prepared for the system call being made.) For example, C passes all parameters to a function on the hardware stack, but the system routines need those parameters in CPU registers. The glue routine moves the parameters from the stack into the registers and then passes control to the function being invoked, thereby "glueing" the calling software to the system routine.

One very useful component of the Aztec system is its optional Source Level Debugger. In many C environments, you may have written your program in C, but you must debug it in assembly language. With the Source Level Debugger, you need look only at your original source code file—in most cases bypassing an assembler listing—in order to find your bugs. This is a tremendous benefit because you decrease the overall learning curve by having to learn only one language, not two.

Lattice C

The original Amiga C, as distributed by Commodore to all developers, Lattice has since undergone numerous revisions, but still retains a wide following of devotees—approximately equal in number and commitment to the legions of Manx supporters.

The documentation eases you into the language more slowly than the Manx package. The first three pages of the manual thoughtfully describe how to get technical help from Lattice. In general, the manual is friendlier, but no more complete.

The latest incarnation of Lattice C finally affords the programmer some choices (albeit only two) regarding memory models. There are also several example programs and some very clearly written pages explaining Amiga program organization and the different categories of Amiga functions that can be accessed.

Once again, polish up on the CLI before trying to do C programming with this system. A programming session with Lattice is basically the same as with the Manx system, except that the Manx compiler operates a little faster.

Like Manx, Lattice offers very good ROM Kernel support via linked-in glue routines, but it also provides a method for calling the ROM Kernel routines directly, without going through the glue routines. This makes execution of these calls a little faster.

Overall, I prefer the Manx system to Lattice's, but just barely. Both companies will probably continue to offer improved versions of the language for years

to come—at least I hope so—because through such competition we all benefit. I do wish, however, that some company would integrate an editor with its compiler à la Turbo C from Borland. Any takers?

Modula-2

Modula-2 was developed by Niklaus Wirth as a replacement for his popular Pascal language. It is fast becoming a widely used Amiga language because it is easy to understand and at least two of the environments available are both easy to use and robust.

With Modula-2 you divide your programming problems into modules, each of which handles a specific function. A module has two parts: The Definition module tells the outside world what the module expects as parameters, and what it will send back to the calling software as a result, while the Implementation module contains the actual programming statements that get the work done. As long as the Definition is not changed, you can change the Implementation any way you want, without having to modify the way the rest of your software interacts with this module.

Modula-2 forces you to analyze your projects in terms of modules, and it is also very strict about ensuring that the proper parameters are passed to other functions. At first, this can be very frustrating, because the language seems so "picky." After some experience with writing code in Modula-2, however, you will discover one major benefit: If you can get your programs to compile *and* link successfully, they will almost certainly run correctly. Modula-2 compilers prevent 90% of the programming errors that you can make—not just syntax errors, but logic errors as well.

Some people consider Modula-2 slow, cumbersome, verbose, and hyper-sensitive, but this is a matter of personal taste and not an opinion with which I agree. Another criticism—perhaps more founded—is that the language has no support for "pre-initialized data structures," referring to the ability of languages such as C to specify directly the contents of an area of memory. In Modula-2 the program you are writing must use program statements to store data into memory when the program starts running. This is not an insignificant shortcoming, because Amiga programming relies very heavily on a variety of data structures that must be initialized prior to use.

Let's look at the three main compilers on the market: TDI Modula-2, M2Amiga, and Benchmark Modula-2. Each is a complete system for Amiga development, and all use glue routines to interface with the ROM Kernel functions as described above for C. This, however, is where the similarities end.

TDI Modula-2

TDI offered the first major Modula-2 for the Amiga. It was purchased by a lot of people who wanted something better than BASIC and easier than C. They definitely got that, but they also received one of the more user-hostile development systems I have ever seen. Of the manual's 350 pages, fewer than 40 tell you anything about writing Modula-2 software or using the system. The rest of the book is devoted to one example program of a rotating cube (which looks very nice) and to listings of the Definition modules for all the Amiga-specific functions and include files. If you plan to learn Modula-2 using this system, the purchase of a textbook for the language is mandatory.

The edit-compile-link loop is similar to the C loop described above, except for one major improvement. The TDI editor will read an error file made by the compiler, allowing you to move from one error to the next to fix problems found during compilation. This is very handy, although in my version this feature worked only part of the time.

Because I know someone who is a Modula-2 expert, I was able to limp along with this software after a few days of intensive effort, but I never want to go back to it. Its compiler is very slow and the amount of RAM or disk space required for its temporary files can be huge. The finished code runs very quickly, but I would not buy it for my only Modula-2 system. In fact, I just would not buy it.



M2Amiga

My problems with this software began when I tried to create a working version of the distribution disk using the software supplied to do so. It crashed several times, which made me worry more than a little about the quality of the compiler itself. When I finally got a working version and started playing with the software, however, I was pleasantly surprised.

I was able to start compiling the M2Amiga demo programs in just a few minutes, because you can use the software entirely from the Workbench if you so desire. Click on the icon for any text file created with the M2Amiga editor and it will load and let you edit the file. Next, after saving your changes, double-click the M2Amiga compiler icon to start the compiler, which will let you compile as many modules as you like, one after the other. Finally, by clicking on the icon for a compiled object file, you tell the linker to link it with the other needed object modules. This makes working with M2Amiga very easy for the novice programmer. You can also use the system entirely from the CLI and completely defeat the generation of icons for every file.

The documentation is adequate in explaining the operations of the editor, which is a substantially simplified version of EMACS, a popular programmer's editor. Like the TDI editor, M2Amiga's can read an error file and let you walk through the file to fix problems. The manual shows you how the compiler itself organizes your programs, and explains some of the fundamentals of Modula-2 design.

The marketing company, Interface Technologies, provides additional support software, including a Source Level Debugger, special-purpose libraries, and ►

a Developer's Kit (although exactly what the last item is supposed to do is not really clear). The system seems fine for development as it stands.

Benchmark Modula-2

For my money, the latest Modula-2 compiler to reach the market is also the best. The Benchmark package uses an integrated editor-compiler-linker that is hard to criticize. This editor is also based on EMACS, but has been extensively enhanced, rather than reduced in scope. After editing your software, just press a function key (a keyboard template is provided) and the compiler will load and compile your module very quickly. If any errors are found, you can step through the file to correct them. Press a second key to achieve your linking and then a third key to run your program—all without leaving the editor! This is convenience *and* speed. Some of the editor command names are a little hard to fathom, but help is always available via the Help key or the manual.

Benchmark's documentation—more than 500 pages strong—goes to great lengths to explain how to use the editor and the entire integrated system. It also includes listings of the Definition modules needed for Amiga support. The entire environment is so friendly and easy to use that both development and learning time are reduced. I am convinced that a novice Modula-2 programmer could sit down with the manual, example files, and editor and start writing original programs in just a few hours.

Benchmark's maker, Avant Garde Software, also offers a variety of support software to make programming easier, such as a simplified Intuition library, a library of C language equivalent functions designed to reduce the time needed to translate C software to Modula-2, and a library of IFF routines.

BASIC

BASIC has a bad reputation as a flimsy, non-standard programming language for "wimps" who don't have the guts for C. Perhaps there once was some truth in that, but this attitude is now simply uninformed. Every BASIC implementation for the Amiga covered here has several redeeming features and offers nearly complete access to the Amiga's power. In terms of speed, at least two of them produce code that runs along very reasonably. They are also all very easy to learn and to work with. In fact, probably the only valid criticism one could have of BASIC is that it teaches some bad programming habits, but even that is not true in all cases. So read on before reformatting your Extras disk to make room for "serious" programming tools.

True BASIC

A structured BASIC utilizing many modern programming ideas and constructs, True BASIC lends itself readily to modularity and simple, understandable program design. It uses a decent, although defective, editor with simple cut-and-paste, search, and find-and-replace functions. From within the editor, you can run, trace, or compile your program. The compilation option compiles the file in the editor's buffer and then allows you to save the compiled code to disk. True BASIC does not compile programs into machine code, but rather into a computer-independent type of pseudo-code. This means that if you want to distribute True BASIC generated software, without also distributing your source code, you must get a license from True BASIC to distribute its run-time support code.

Documentation for True BASIC is very, very good—some of the more professional that I have ever seen. Using large type in two ring-bound volumes, it is easy to read, well indexed, and informative. In fact, if the software were as well tested as the manuals obviously are, this would be a great BASIC. Unfortunately, I have found the compiler to be very slow and moderately buggy, generating random errors on large files, once even corrupting the text buffer and destroying my source code.

The language itself sports a command set that the makers claim is completely compatible with True BASIC running on the IBM PC, Atari ST, and Macintosh computers. You can also purchase an optional Developer's Toolkit that will give you access to all of the Amiga's special functions via True BASIC's glue routines, but of course this makes your code non-portable. That brings me to my number one complaint with this BASIC: The compatible command set just is not Amiga-enough to make anything that looks Amiga-esque.

The Line, Box, and Draw type functions are just too generic, but by using the extra-cost Developer's routines, you lose portability. This is acceptable, though, because Amiga Basic gives you the same sort of low-level access to the Amiga, as we will soon see. Thus, if all you want to do is write programs that will look and run the same on the four machines True BASIC currently supports, this is the dream language for you. But is that really the kind of software you want to write on *your* Amiga?

True BASIC Inc. also offers a number of useful support libraries for such tasks as string manipulation, 3-D graphics, and sorting and searching.

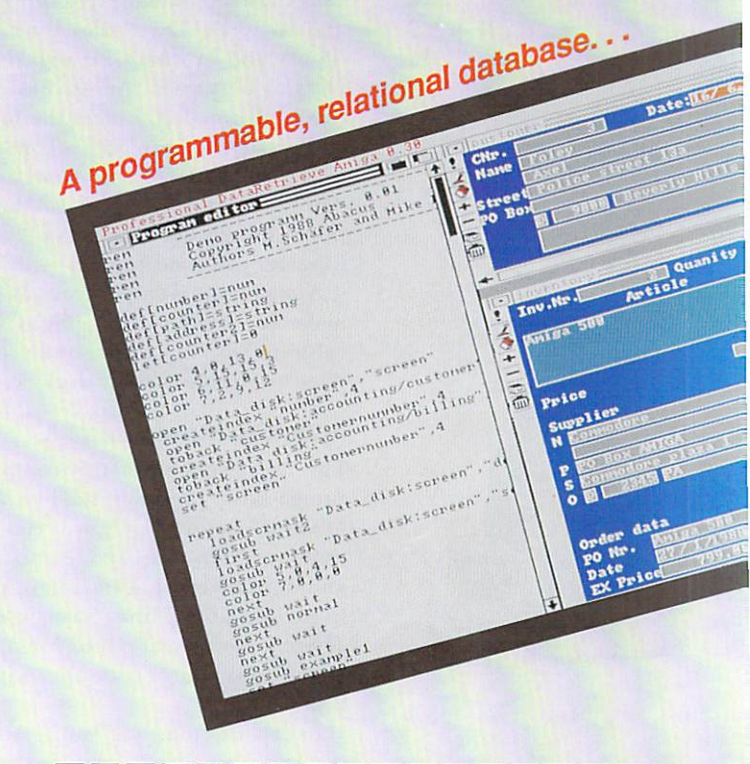
Amiga Basic

In case you haven't broken in your Extras disk yet, do so now. The BASIC you got when you bought your Amiga may well be a good enough language for whatever you want to do. Well documented (including an enourmous errata list), the Amiga version of Microsoft BASIC is a reliable, structured implementation with loads of built-in Amiga-specific functions. It is an interpreted BASIC, but with the AC/BASIC compiler v1.3 (discussed below) you can compile stand-alone software.

I do, however, hate the editor (which has been ►

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made to look as much like the Mac version as possible). The cursor is so small and the mouse-ahead problem so great that I can never keep track of my position in the file for any length of time. The solution to this problem? Do most of your editing with another editor, then use the Amiga Basic editor for fixing syntax errors and the like, as you find them while testing your software.

In addition to the Amiga-specific command words, Amiga Basic also gives you near complete access to the ROM Kernel routines, via FD file conversion. FD files are "Function Definition" files distributed by Commodore, one for each library in the ROM Kernel. There are separate files for Intuition, Exec, Graphics, and so forth. These files list each function in the library and in what CPU registers it expects parameters to be passed. Amiga Basic wants to have this same information, but in the form of a BMAP file, so Commodore provides a conversion program that will create a BMAP file from an indicated FD file. After doing this, you can call the ROM Kernel functions directly by telling Amiga Basic to open the libraries you want to work with.

Amiga Basic is easy to learn and the trace functions make for simple debugging. Once you have great software working with the interpreter, buy the compiler and make it *really* work.



AC/BASIC Compiler v1.3

The latest version of this compiler will make your Amiga Basic programs act like you have never seen them act before. They will run *fast*. This compiler translates your source code into 68000 machine code, and does it very quickly. I have pumped source files in excess of 5000 lines through it with no problems. There is no special editor for it, so you will have to create your source-code files with ED or the Amiga Basic editor.

In order to use your Amiga Basic software with the compiler, you may be required to make a few changes to syntax and, in some cases, to change the order in which you might take certain programming steps. If you write code for the compiler, however, nearly all of it will work perfectly well with the interpreter. I found a large number of discrepancies between the two in the 1.2 version of the compiler, but v1.3 seems to have corrected all of these problems. AC/BASIC also introduces some new control structures and commands that can create incompatibility between the two environments.

Normally, the AC/BASIC runtime files must be present in order for your compiled software to work properly; you can, however, compile your code in such a way that the runtime code is added automatically to your file. This makes it completely standalone, but you are required to file a no-cost license with Absoft in order to distribute files with the runtime code built in.

The excellent manual that comes with the compiler carefully explains all the commands recognized by the compiler, allowing you, in effect, to use it as a substitute for the Amiga Basic manual. It is full of examples and good suggestions, and it is printed in large, readable type. The compiler operation is fully covered and the compiler itself—all mouse-driven—is very easy to use.

AC/BASIC achieves ROM Kernel access in the same way as Amiga Basic does, so compatibility is no problem here. With total system control and machine-language speeds, you can create programs in BASIC that look like they were written in a "real" programming language.

F-Basic

For a complete change of pace, try this BASIC compiler from Delphi Noetic Systems Inc. Producing the fastest code from BASIC source that I have seen, it has many advanced programming and optimization features, as well as several functions that make Amiga-esque programming easier. This language also requires the most technical expertise of all the BASICs, and it has the highest learning curve, owing to its complex capabilities and the all-CLI interface. No matter, it is worth the effort. Besides, there are 70 example files included with the package to help you out.

Some of F-Basic's powerful features not found in most other BASICs include recursion, record structures (like C structures, and very handy on the Amiga), pointers, include files, and direct access to the 68000 CPU registers. You need not use any of these advanced commands, but they are present if you find you want them in the future.

There are functions to let you work easily with Amiga windows, screens, and menus, but be prepared to learn something about how text strings and numbers are organized in memory. These functions are also quite limited, so you may find yourself researching how to call the ROM Kernel routines from F-Basic. You can do it by inserting the simple statement "&SYSLIB 1" in your source file, and then issuing the F-Basic command to open the desired libraries. With the right libraries open, you can call any of the ROM Kernel routines, passing the documented parameters to them. I am not sure if F-Basic system calls go through their own glue routines or if the registers are prepared and the calls made directly, but it works.

It is necessary to have the F-Basic runtime support library available at all times while running both the compiler and your own compiled software. (The compiler itself is written in F-Basic!) If you want to distribute your F-Basic code with the runtime support, you must file a license and a $10 registration fee per product.

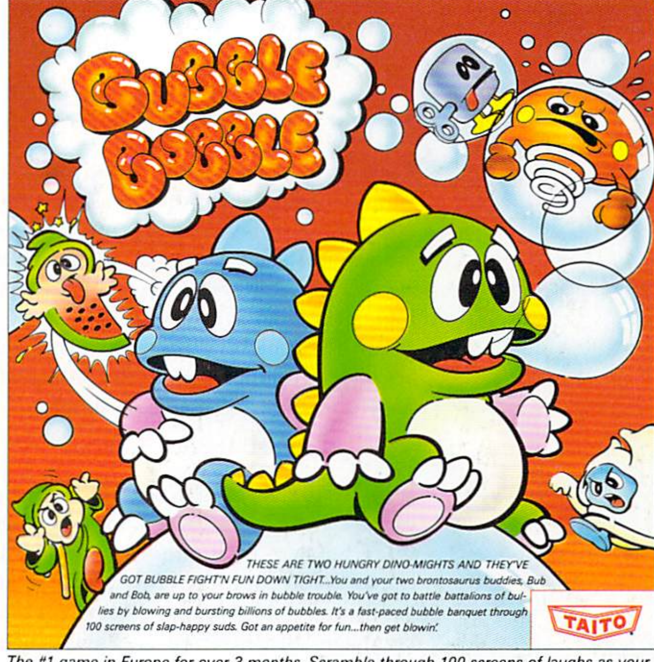
The makers of the package advertise that a better version of the compiler, a Source Level Debugger, and the "F-Basic Logic Programming Extension" (somehow related to Prolog and Lisp), are all in development. BASIC was never like this.

If you want a BASIC you can be comfortable with right away, my suggestion is to stick with Amiga Basic ►

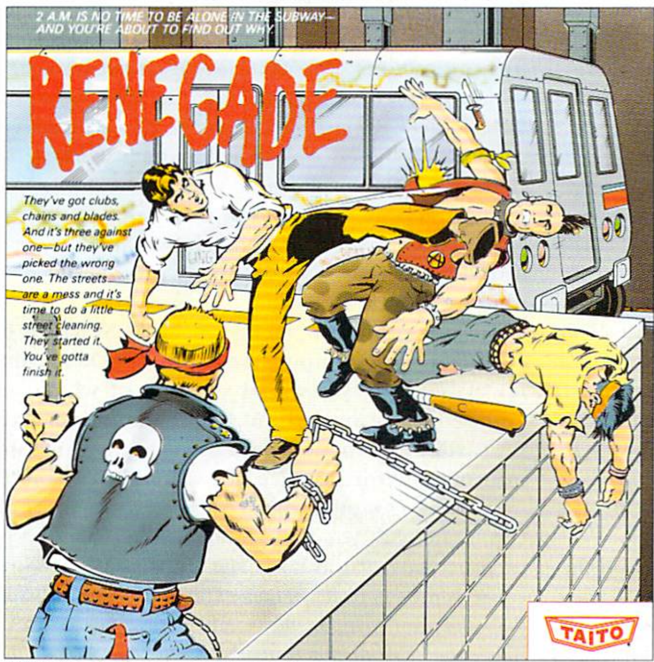
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and to buy the AC/BASIC compiler. If more power and speed are what you are after, then F-Basic is the right choice—if you have the time to devote to learning it.

Forth

They say you either love Forth or you hate it. And while you may meet the occasional fence sitter, the adage is essentially true. If you like writing assembly language—like I do—you will probably love it because its the closest thing to an assembly-language high-level language.

Forth is a highly-customizable language. The very act of programming in Forth consists of adding commands to the language. The statement

```
: hello ." Hi there" ;
```

is really the Forth way of defining a new command called "hello" that when executed will print "Hi there." Every Forth implementation has an interpreter *and* a compiler. You define your program by compiling your own set of new commands into the language; the interpreter then executes whatever commands you tell it to. For instance, simply type

```
hello
```

and the Forth interpreter will execute your new command. Commands, or words, are stored in a "dictionary" grouped into several different "vocabularies." Forth is sometimes called a threaded language because the vocabularies "thread" their way through the dictionary, linking words together.

Not the most comprehensible of languages, Forth uses esoteric names and real Forth programmers insist on correct pronunciation of these names. Your ability to read and understand Forth source, even your own, depends completely on the programmer's own clarity and style. Yet it is possible, rumors to the contrary notwithstanding, to write intelligible Forth programs. Forth also forces programmers to think in terms of modular code. The shorter and simpler a Forth word definition is, the better, so each word in a program tends to do just a little bit of work.

Forth words pass parameters to one another on the stack, but unlike commands in most languages, they are able to return multiple results to the calling software.

Two representative Forth implementations for the Amiga are CSI Multi-Forth and JForth from Delta Research. Both are well-written, professional software packages with good documentation and lots of examples. Both have 68000 assembly-language interfaces and the ability to create stand-alone programs.

Multi-Forth

Definitely the glossier of the two, CSI's version is an easy-to-work-with, multitasking Forth. The manual is well written and illustrated with line drawings describing the functions of some of the words in the vast Forth dictionary. It is not a complete Forth tutorial, however, so you will need another book on Forth if you want to create complex programs.

It is very easy to set up a good working environment in which you can move easily from editing a program to compiling it. Although Multi-Forth does not come with an editor of its own, it is small enough that you can run it simultaneously with, say, EMACS. Because EMACS runs on its own screen, you make your changes to the file, save it, go back to the Workbench screen where Multi-Forth is running, and tell it to compile your program.

CSI provides a very large glossary of Forth commands, but the company could take a lesson from its JForth counterparts by including a list of words organized by function. When you are looking for a word to perform a certain task, very likely you may not know its name, leaving you no option but to paw through the glossary randomly until you find it.

The compiler seems a little slow and it can take several minutes to compile very large files, but I have found no major bugs in it. Multi-Forth is a true multitasking Forth ideally suited to the Amiga environment. With only one copy of the compiler/interpreter in memory, you can run as many individual, unrelated Forth programs as you like.

Multi-Forth provides access to all the ROM Kernel functions. It uses glue routines to remove parameters from the stack and passes them to the system functions in the CPU registers. Multi-Forth also has several specially designed words to facilitate working with C-like structures, allowing you to "compile" data straight into memory and to then refer to the structure contents, or fields, in much the same way as you would in C. This is a plus for C programmers who want to convert to Forth.

Product support is very good, and CSI has its own Q&A forum on CompuServe (type GO FORTH) made up of both users and CSI staff, all of whom seem knowledgeable and helpful. Such a setup is rewarding for Forth programmers because it allows you to share information; for instance, if I write a command that makes the compiler easier to use, I can share that command with you and you can then make it a part of your copy of the language. This is important because it means that we can extend the capabilities of the compiler/interpreter itself. We can write our own language. Try doing that in BASIC.

CSI promises an updated version of Multi-Forth for release later this fall that should sport a smaller code size, IFF support, and increased speed.

JForth

A more technically oriented Forth, JForth executes and compiles faster than the current implementation of Multi-Forth. It also uses true 32-bit addressing when referencing dictionary entries—a faster, although slightly more memory-consuming method.

There are no cute drawings in this manual, just ►

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Product Information

C

Lattice C Compiler 4.0
Lattice
2500 S. Highland Ave., Suite 300
Lombard, IL 60148
312/916-1600
800-533-3577
$225

Aztec C68K/am-p
Manx Software Systems
One Industrial Way West
Eatontown, NJ 07724
800/221-0440
$199; $299 developers (am-d)

Source Level Debugger
Manx Software Systems
see address above
$125

Modula-2

Benchmark Modula-2
Avant Garde Software
2213 Woodburn
Plano, TX 75075
214/964-0260
$199.95
$99.95, library modules

M2Amiga
Interface Technologies Corp.
3336 Richmond, Suite 200
Houston, TX 77098
713/523-8422
$249

TDI Modula-2
TDI Software Inc.
10355 Brockwood Rd.
Dallas, TX 75238
214/340-4942
$99.95; $149.95 developers;
$299.95 commercial

BASIC

A/C Basic Compiler
Absoft
2781 Bond St.
Auburn Hills, MI 48057
313/853-0050
$195

True BASIC
True BASIC Inc.
39 South Main St.
Hanover, NH 03755
603/643-3882 (service)
800/TRBASIC (sales)
$99.95

Also from True BASIC Inc.:
Advanced String Library
3-Dimensional Graphics
Sorting and Searching
Developer's Toolkit
Run Time System
$49.95 each

F-Basic
Delphi Noetic Systems Inc.
PO Box 7722
Rapid City, SD 57709-7722
605/348-0791
$79.95

Forth

Multi-Forth
Creative Solutions Inc.
4701 Randolph Rd., Suite 12
Rockville, MD 20852
301/984-0262
800/367-8465
$89

JForth
Delta Research
PO Box 1051
San Rafael, CA 94915
415/485-6867
$99.95

350 pages of relatively clear explanation, with an extensive index and a word list organized by function. An excellent alphabetic glossary affords numerous usage examples of the defined words.

You can create an edit-compile loop procedure using JForth and EMACS similar to the one I described with Multi-Forth, and I recommend that you do so. JForth provides good ROM Kernel support, also in similar fashion to Multi-Forth, except that JForth has a special mechanism that allows you to conveniently add support for other libraries by using the FD file for the library and then writing the one or two words needed to open the library. In Multi-Forth you must write your own glue routines for each function for new libraries.

JForth also includes floating-point math functions (most Forths use fixed-point math only), a 68000 disassembler, several "easy Intuition" functions for menus and the like, a slightly more natural C structure interface, and the very clever ability to switch between four different Forth dialects, or standards, for those programmers who *must* have a Forth exactly like the one they have worked with on some other machine.

It is difficult to recommend one of these Forth implementations over the other because both are very good. Like the situation we encountered with Manx Aztec vs. Lattice in the C arena, it is likely both these Forth companies will continue to offer improved revised versions for a long time to come—to everyone's benefit.

And now you have seen four high-level languages for the Amiga, with a total of 11 different implementations. Perhaps the amount of choice makes it more difficult, rather than less, to select the one that is best for your kind of development needs. Yet, at least we Amiga users cannot complain that there isn't a wide range of good Amiga-specific options for creating exciting, distinctly Amiga-esque applications. ■

Martin Murray is a professional programmer who has written both commercial and public-domain software. Write to him c/o AmigaWorld *Editorial, 80 Elm St., Peterborough, NH 03458.*


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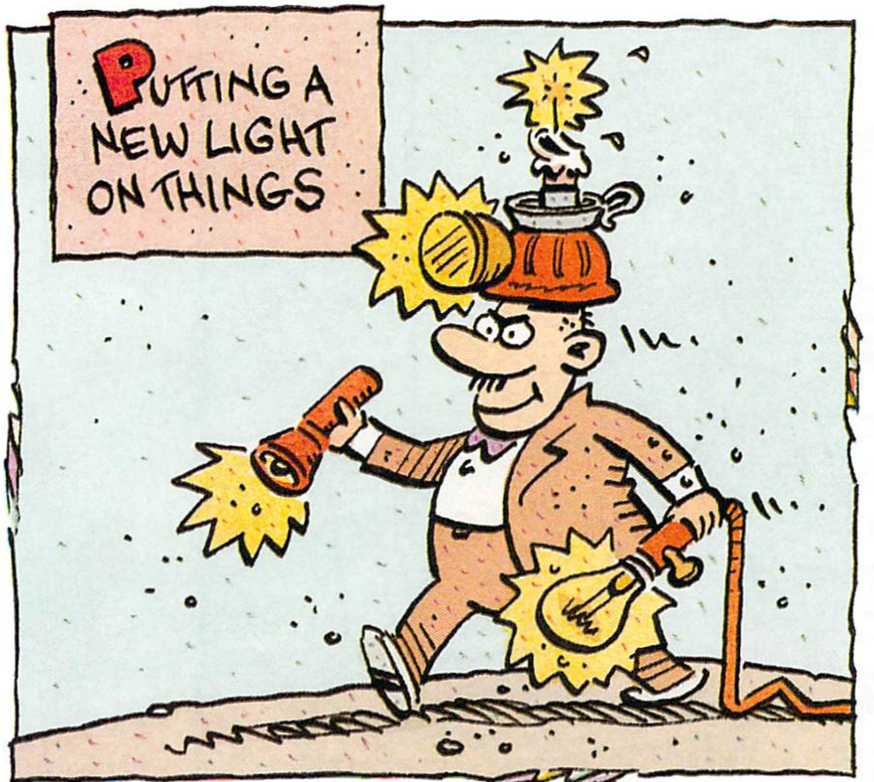
Make your digitizing pixel perfect with this down-and-dirty short course of tips, techniques and quick fixes.

By Gene Brawn

ILLUSTRATED BY ELWOOD H. SMITH

AIM THE CAMERA, turn the filter wheel, and activate the digitizing software. What could be easier? You can digitize anything from your dog to the Mona Lisa. Getting the digital Mona to look like herself, however, and not like your dog takes a good camera, the right lights, experience, or a lot of luck.

Given the best possible equipment and artwork, any one of several fine Amiga digitizers can produce startlingly realistic images. These elements rarely converge in the average system, but the following tricks and tips will help you improve a less-than-perfect setup. Because NewTek's Digi-View is the most common digitizer, I will refer to that system (Digi-View software, Testrite copy stand, and Panasonic WV-1410 camera) in the examples.



OH, SAY CAN YOU SEE?

If you do not have the proper lighting to see an image clearly, do not expect to digitize it clearly. To check your lights, digitize a plain medium-gray card. You will see immediately where the lighting is uneven. If the discrepancies are minor, position white cards around the copy stand's baseboard to reflect the light and fill in any dark spots. If the problem is more severe, use diffusion filters, pieces of nonflammable plastic or cloth placed over the reflector. The filters soften the light so that it covers an area more evenly. Because the filters also reduce the light level, increase your lamps' power by about 25 watts.

PUTTING A NEW LIGHT ON THINGS

According to NewTek, Digi-View is balanced for light with a color temperature between 2800 Kelvin (the average color temperature of house lights) and 6000 Kelvin (the average color temperature of daylight). Presented with such a wide range, I experimented with different lights. Professional photofloods yielded mixed results, seeming too bright for the camera and filters. With Cool White fluorescents, which have a color temperature of 4500K, the color was right on; the illumination was even and I never had to use the air conditioning. You will need two short, one-piece units similar to those found under kitchen cabinets over counters. Available at most hardware stores, the complete, ready-to-use fixtures cost between $10 and $20 each.

SUCK IT IN AND KEEP IT FLAT

Hot lights and paper do not coexist very well. After too much baking, the edges of the paper curl up and it starts to look like a plastic 3-D map with little mountain ranges and valleys, making it difficult to focus the camera.

A fancy fix for professionals is a vacuum easel, which uses a vacuum pump to suck air through hundreds of tiny holes in the easel's flat top. Place your artwork over the holes and the suction will keep it absolutely flat. The easels sell for as little as $100, without a vacuum pump. Supply your own pump or use an industrial vacuum cleaner (if you can stand the racket). The one disadvantage of vacuum tables is that they will not hold books flat, unless you remove the pages.

A less elaborate solution is to place a piece of plate glass on the art or book to keep it flat. Be very careful when you set your lights to avoid hot spots. In extreme cases, you may have to use polarizing filters on both the camera and the lights to eliminate the reflections. If you use regular window glass, colors will shift toward green. Correct the problem with the RGB sliders in the colors menu or change the RGB filters.

JUST LOOKING AT THE PICTURES

Even if you have the perfect lights and a flat subject, matching the digitized image to what you see in the original can be frustrating. Although a powerful imaging device, the Amiga is not capable of resolving all of the colors and shades in a well-exposed, continuous or halftone picture.

To determine whether a picture will digitize well, ►

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follow these rules of thumb. Pictures with a lot of texture digitize the best. Try to avoid broad areas of solid color, they show off uneven lighting. Clear blue skies and blank walls are big troublemakers. Detailed, high-contrast images are equally difficult to work with. Resolving detail in the shadows is especially tough; they usually end up looking like black blobs. If you must use this type of image, try putting the best exposure for each important part of the picture in separate files. You can recombine the pieces in a paint or image-processing program.

FIND YOUR COLOR

Find Your Color

To help you match your digital colors to the originals, you should use a reference picture to calibrate your system each time you digitize. Marketed for professional photographers, Kodak's Color Separation Guide and Gray Scale reference set contains two useful items: a 20 level gray-scale card and a color-accurate chip chart. Mount both to a stiff, durable piece of cardboard. Digitize the charts when your lights are new, varying the camera's f-stop, the lights' positions, and the program's color controls until you match the screen's colors to those you see on the charts. Jot down the settings and tape them to your camera for reference. If the colors of your latest effort do not seem to be correct, adjust them starting from your original figures. If nothing looks right, put the chart in the scene next to the artwork and start over.

Auto-gain Is a Pain

Your camera could be working against you. Every time I adjust the f-stop on the lens to darken an overexposed picture, the auto-gain resets the camera to even out the contrast, giving me a washed-out picture. You cannot disable this feature, but you can minimize its effects. Always mask out any parts of the image that you do not want to include in the final picture, because large light or dark areas can cause the auto-gain to overcompensate. You can use this same shortcoming to your advantage for severely over- and underexposed pictures. Surround the artwork with a black or white card (respectively) to force the exposure to the level you desire.

A piece of black velvet should be a part of every digitizer's toolbox. It will not reflect lights or cause flairs. Because it does not add any color to a scene, black velvet is great for shooting items in limbo, eliminating the need to cut away backgrounds.

Fault Lines

You must keep your digitizing setup, from the table to the camera, free from life's little earthquakes. To avoid vibration from the printer and your actions at the keyboard, place the copy stand on its own table. If you have wooden floors, put the table in a corner of the room where the floor is most stable.

While digitizing, pause a few seconds after you turn the filter wheel. The camera's support column is a little flimsy and can oscillate for a while after you touch it. For those who cannot keep still, the Digi-Droid (NewTek) turns the filter automatically.

Out of Register, Not Out of Luck

If you cannot reshoot an out-of-registration picture, you can try to salvage it with DeluxePaint (Electronic Arts) and PixMate (Progressive Peripherals & Software). Use PixMate, DeluxePhotoLab (EA), or Butcher (Eagle Tree Software) to save the red, green, and blue exposures as separate IFF files. Load two exposures, one as a screen and one as a brush, into DeluxePaint. Line the exposures up, flip to your spare screen, and stamp the brush down. Load the third exposure as a brush and repeat the process with the two exposures that are in register. You can also use PixMate's Auto RGB Merge feature.

Left Out in the Field

To digitize an image that is too big for the camera's field of view, simply replace the camera support col- ►


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umn with a taller one. If you cannot find a suitable replacement pipe at a hardware store, contact Testrite for replacement columns up to 38-inches tall.

If you have already exceeded your digitizing budget, there is another solution. Mount your lights one to six inches from the baseboard corners nearest the camera support column. Place the copy stand so that the light brackets and camera support column just stick out over the edge of the table. Turn the camera arm around on the column so that the camera is pointing at the floor. If you are still using the standard lights, unscrew the arms and lights from their brackets and mount them upside down so that they point at the floor. If the subject is very large, you may have to add some supplemental lights to even out the illumination.

Transparent Digitizing

You can cut down on your electric bill, eliminate uneven lighting problems, and dramatically improve the quality of your pictures by digitizing directly from transparencies and negatives. By adjusting a camera's mechanical or back-focus control, you can emulate the macro setting (used for extreme close-ups) of expensive lenses, letting you focus the camera to nearly the front element of the lens.

To use the back focus to digitize slides, put a piece of glass or frosted plastic between the lens and the filter wheel. Tape a piece of smooth white paper or frosted plastic on the bottom of the glass, and be sure nothing touches the wheel. Position a light one or two feet beneath the glass, pointing up at the camera. Put a slide on the glass, then turn on the lights and the camera. Adjust the back focus until the image of the slide is sharp, and digitize as usual.

Flat and Soft

Designed to work best in low light, the Panasonic camera's standard lens is fast but flat; it lacks contrast. The soft, almost unfocused look is pleasing in many situations, but not if you want a crisp, high-contrast image. You can replace the lens with a 35mm camera lens, but you will need a C-mount adapter to attach it. Zoom lenses do not work well with copy stands. They are too slow, too long, and too expensive. Use a fixed-focal-length lens, instead; the ideal focal lengths are 35mm to 50mm for still camera lenses and 12mm to 25mm for 16mm film and video types.

Co-starring . . . the Lens Cap

While the camera is the star of the digitizing show, the lens cap plays an indispensible supporting role. On of the most common causes of damage to a video camera is not replacing the lens cap. Besides keeping dust off the lens, that little cap protects the light-sensitive phosphors on the camera's pickup tube from unintentional exposure. If exposed to strong light for even short periods of time, the phosphors can be permanently imprinted, or burned-in, with an image of the source of the light.

To avoid damage, always replace the lens cap if you are not using the camera. When you are digitizing, pay particular attention to bright reflections; these hot spots are extremely deadly. Most important, *never* point a capless camera directly at a light.

Chipping Away and Filtering Out

How would you like a camera that is practically indestructible, has great contrast, cannot be burned-in, does not need RGB filters, and is lighter than its lens? For around $1000, Sony, Canon, Sanyo and Panasonic, to name but four, offer black-and-white and color CCD (Charged Coupled Device) cameras that are completely solid-state (including the pickup tube, which is now just another chip in the circuit). The CCD produces a crisp, sharp-edged picture perfect for digitizers. Chronic lens cap losers will appreciate that the chip is effectively immune to hot-spot burn-in and lag. If you demand the best, RGB video cameras ►

Product Information

Digitizers and Frame Grabbers:
Digi-View
NewTek Inc.
115 West Crane St.
Topeka, KS 66603
913/354-1146
$199.95
512K required.

Frame Capture
Mimetics Corporation
PO Box 60238, Station A
Palo Alto, CA 94306
408/741-0117
$199.95
Mimetics' ReaSyn board required.

FrameGrabber
Progressive Peripherals & Software
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Denver, CO 80204
303/825-4144
$499.95

Live!
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6114 La Salle Ave., Suite 326
Oakland, CA 94611
415/339-0339
$295

Perfect Vision
SunRize Industries Inc.
3801 Old College Rd.
Bryan, TX 77801
409/846-1311
$219.95

ReaSyn
Mimetics Corporation
see address above
$699.95

Companion Products:
Butcher 2.0
Eagle Tree Software
PO Box 164
Hopewell, VA 23860
804/452-0623
$37

CS-1 Copy Stand
Testrite
available from: NewTek Inc.
see address above
$74.95

DeluxePaint II
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
415/571-7171
$129.95
512K required.

DeluxePhotoLab
Electronic Arts
see address above
$149.95
One megabyte required.

Digi-Droid
see address above
$79.95

Panasonic WV-1410 Camera
Panasonic Industrial
One Panasonic Way
Secaucus, NJ 07094
201/348-7183
$300

PIXmate
Progressive Peripherals & Software
see address above
$49.95
512K required.

Replacement Copy Stand Columns
Testrite
135 Monroe St.
Newark, NJ 07105

Several models of CCD cameras are available. Contact:
Canon USA Inc.
Video Division
One Canon Plaza
Lake Success, NY 11042
516/488-6700

Panasonic Industrial
see address above

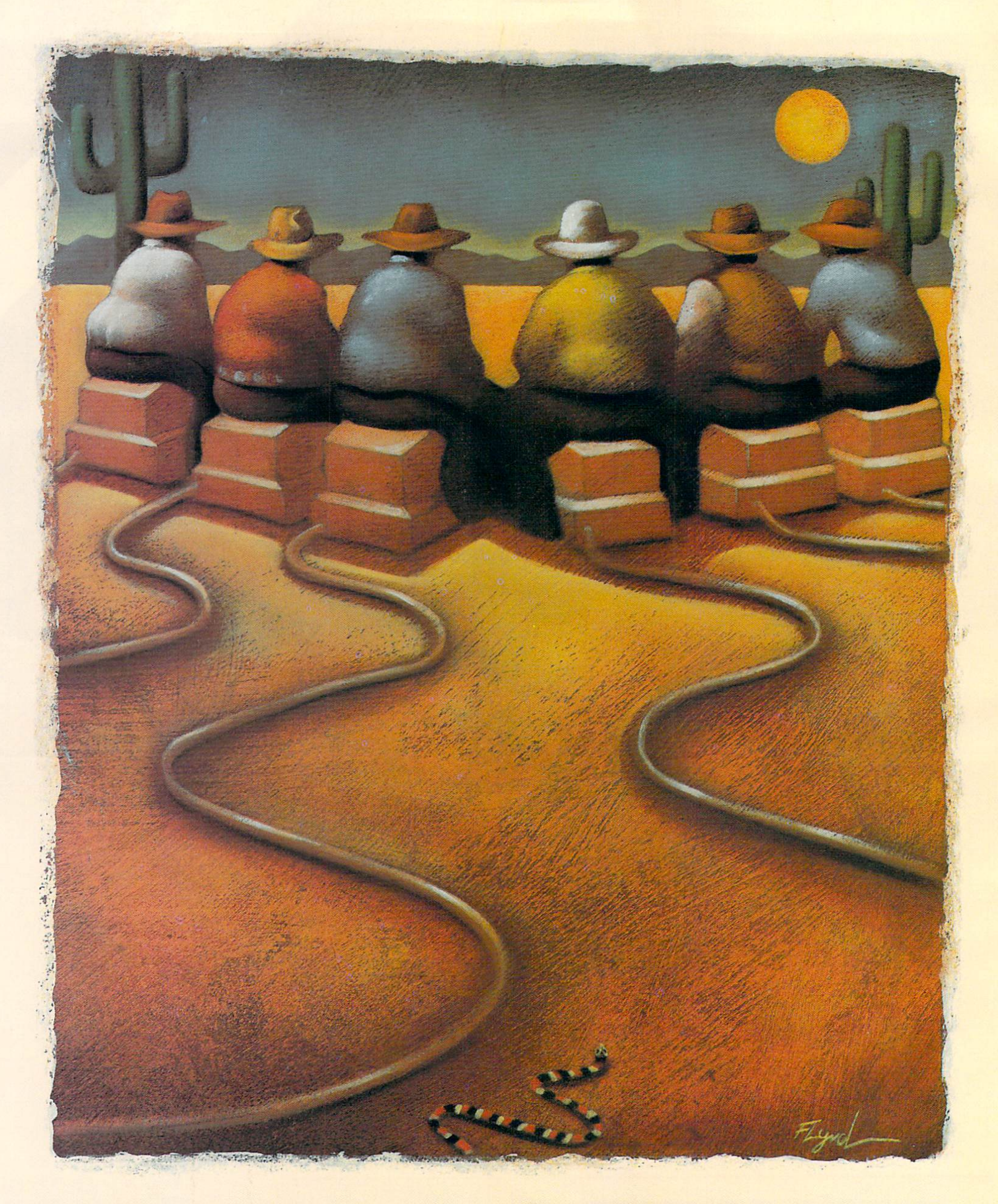
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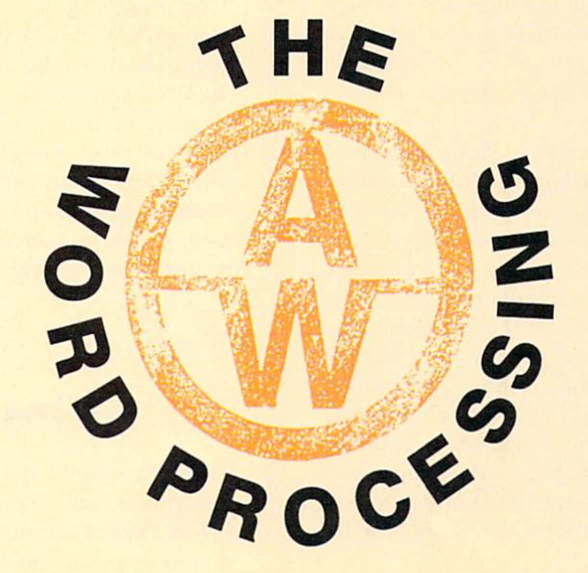
Sony Corporation
Sony Drive
Park Ridge, NJ 07656
201/930-1000

are the only choice. By getting your red, green, and blue signals directly from the camera rather than from colored filters, you can dramatically improve the quality of your digitizing. Many types of industrial and broadcast cameras, including CCDs, generate RS-170 encoded video. Switches control whether the red, green, or blue signal comes over the line. Some models are designed especially for digitizing, with separate outputs for each color. Regardless of how you get the RGB information, it will be brighter, cleaner, and sharper than anything you have ever seen with filters.

After you learn the basics, digitizing really is as easy as aim the camera, turn the filter wheel, and activate the software. Careful testing and rechecking, plus a box of emergency supplies will turn your digitized images into masterpieces. ■

Gene Brawn is a graphic designer, television director, and a computer game programmer. He would like to thank Warner Computers in San Diego, CA for their assistance in preparing this article. You can write to Gene c/o AmigaWorld *Editorial Department, 80 Elm St., Peterborough, NH 03458.*


FLynd



ROUNDUP

There are a lot more "brands" to be seen out there in the current herd of Amiga word processors, so we've rounded up choice offerings from 10 leading outfits to see how they compare.

FOR QUITE SOME TIME after the initial release of the Amiga 1000, there were few, if any, real word-processing programs for the Amiga. A roundup such as this article would have been impossible, as there was certainly no "herd" to speak of. In my own case, I felt forced to use the Amiga's Notepad for all my writing because there was literally no better alternative.

Well, pardner, things have changed since 1985 and we're ready to start punching some electronic doggies here, as *AmigaWorld* presents its first "Amiga Word Processing Roundup." Word processors for the Amiga now number well into double figures and new word processors continue to appear. Some are solid implementations that make good use of the Amiga interface and provide us with new ways to create pages. Others . . . well, let's just say it's not very difficult to get a "bum steer."

Finding just the right Amiga word processor hinges on your page-creation needs. Will your documents ►

By Chris Dickman

ILLUSTRATED BY FRED LYNCH

be long and full of complex formatting? Will they be short but combine graphics with text? Will they be straight, unformatted text, which you then import into a desktop-publishing program? And are you sure you don't need a desktop-publishing program, rather than a word processor? Several of the products under review make varying claims about their desktop-publishing abilities, but in reality these are mostly quite limited. Most Amiga word processors, for example, provide poor laser-printer support, which is essential for true desktop publishing.

If you create only the occasional short document, then you might be comfortable with a simple word processor that lacks such features as a spell checker, thesaurus, macro creation, or glossaries. Manuals and academic publications will be a lot easier to create with a word processor that can create footnotes, indexes, and tables of contents. If you need to combine text and graphics, make sure the program has the appropriate typographical and graphics capabilities. Can it wrap text around a graphic or print in color?

There are now Amiga word processors available that cover the spectrum in price, performance, and features. The following overview of ten of the current herd will help you "cut out" the one that's best for your application.

Editor's Note: Many of the individual programs here have been reviewed previously in AmigaWorld. *In such cases there is a citation of the review at the end of each section, should you wish to read about the product in more depth. A chart comparing a variety of features and functions of all ten programs also appears with this article.*



WordPerfect 4.1

What comes on four disks, accompanied by an over 600-page manual and a hefty price tag? Yes, it's WordPerfect, the darling of the IBM PC set come to roost amongst the mice and icons. An initial reaction might be to dismiss WordPerfect as an overpriced PC port, but this would be a mistake. It not only provides superlative control over document formatting, but also takes better advantage of the Amiga than many of its native competitors. It may not be pretty, but it has an industrial strength feel that is not unwelcome for serious keyboard bangers.

This version of WordPerfect is strictly character-based, with no attempt to mix text with graphics. Version 5.0 for the IBM PC now provides such integration, so expect an Amiga release with graphics capabilities in the not-too-distant future. Meanwhile, we have a word processor loaded with virtually every feature imaginable. The spell checker, for example, is very rich, flagging doubled words and permitting phonetic lookup in its large dictionary. The thesaurus is equally weighty and lets you look up synonyms of synonyms simply by double-clicking on them.

I could go on and mention the extensive macro, footnote, endnote, header, footer, math, column, and merge abilities and broad printer support of WordPerfect, but suffice it to say there is virtually nothing you cannot do to text with this behemoth. One would expect it to thus have a rather heavy feel but, in fact it runs quickly, makes good use of the Amiga keys, menus, and requesters, and displays multiple documents in windows. If you prepare long documents or crave to be unfettered by the limitations of most Amiga word processors, park WordPerfect on your hard disk and start creating the ultimate macro—you know, the one that will format your entire document with one keystroke. *(Reviewed by Ted Salamone, Dec. '87, p.18.)*



VizaWrite Desktop

If the title only implies it, the blurb on the box informs us breathlessly in no uncertain terms that "VizaWrite brings desktop publishing to the Amiga!!" I'm here to tell you otherwise. VizaWrite Desktop is in fact a quite average word processor with limited graphics and font-handling abilities.

VizaWrite Desktop would appear to be a port of a Commodore 64 program (instructions in the manual to press the Commodore key betray its eight-bit origins). Despite this it makes good use of the Amiga environment, relying on the mouse, menus, requesters, and icons and steering clear of the Alt and Ctrl keys. VizaWrite Desktop also multitasks and lets you open multiple documents in separate windows.

The display is clean, with the usual scroll bars at the right and bottom of the display and a ruler line at the top, holding indent, tab, line spacing, and alignment icons à la Textcraft. Where VizaWrite Desktop differs is that changes made to the ruler affect the rest of the document. You then have to create a new ruler and reset the values each time you want to return to the previous format or go on to a new one. These rulers easily become strewn throughout a document containing many formatting changes; yes, they can all be turned off, but it is still inconvenient to have to continually click them back on and then off again. Most of VizaWrite Desktop's formatting abilities are adequate but rudimentary, with search and replace, mail merge, and header and footer creation functional but no more. And the absence of a spell checker is hard to fathom in a product in this price range.

A program billing itself as having desktop-publishing capabilities should have flexible graphics and font features, right? Wrong. VizaWrite Desktop goes no further typographically than the Amiga system fonts. You can use native printer fonts, but the result is unpredictable graphics placement, a problem en-

demic to Amiga word processors wrestling with graphics. And graphics themselves prove problematical, displaying in solid white and printing in reverse. Text cannot be placed on the side of images, and, to cap it off, VizaWrite Desktop supports only a narrow range of printers.

More promising is the ability to create glossaries containing text or graphics, and document histories that track creation/revision dates, and word, sentence, and paragraph numbers. A user-defined password feature is a nice touch, except that it often denied me access to my files. But with only rudimentary graphics and text-handling abilities, the appeal of VizaWrite Desktop is limited. *(Reviewed by Louis R. Wallace, Jan. '88, p. 64.)*



excellence!

Admittedly, the title is pretentious, but once past that and a sizable price tag, you will soon be enjoying the benefits of a feature-laden yet somehow sleek word processor that is a pleasure to use. Micro Systems Software is proud of the fact that its programs, such as Scribble! and Online!, have been developed exclusively for the Amiga. excellence! follows in this tradition and fits the Amiga like a glove.

excellence! lets you import any IFF graphic and place it in a text file, but wisely makes no claims in the domain of desktop publishing. Imported graphics do display in color and can be sized and cropped. You can even attach them to a header, footer, or footnote, but there is no way to place text on either side of them and moving them is also quite tricky. Text, not graphics, is the strong point of excellence!.

excellence! follows the popular Amiga tradition of using an icon-loaded ruler to control document formatting. The ruler holds the usual tabs, indents, and alignment icons as well as one for adjusting interline spacing in points. The ruler can also be turned off, leaving virtually the entire screen for text.

It is the special features of excellence!, however, that make it stand out over its Amiga peers. One expects a spell checker but unexpected are real-time abilities—if you wish, it will inform you of a mistake as you type. The thesaurus is equally welcome but, again, the ability to also look up antonyms is unusual. Beyond this lies a grammar checker; run this on your text and discover all doubled, redundant, and pretentious words. It happily flags these in the text, makes suggestions, and lets you type in changes. Great. And if you want more punishment, it will compare your missive to the Gettysburg address and a Hemingway short story and display the results in a bar graph. Exhausting but fascinating.

Other useful features include tables of contents and index generation, math abilities, mail merge, and a very powerful glossary feature that can be used to create complex macros. All this in a design that feels somehow like it belongs on the Amiga—no Function/Control/Alt key rubbish to remember. excellence! should satisfy those with serious document-creation needs that do not involve extensive graphics. Printer support is good, with a nod in the direction of PostScript that I would like to see developed more in future releases. Just make sure you have at least 1 MB RAM and at least two drives (or a hard disk) to make use of all the features of this truly great product. *(Reviewed by Guy Wright, Sept. '88, p. 14.)*



Scribble!

Scribble! was one of the first word processors available for the Amiga that allowed writers to actually do useful work. I confess to a continuing fondness for its simplicity and logical design. It never seems to get in the way of my writing by forcing me to remember a lot of commands.

Reflecting its character-based nature, Scribble! has no ruler line to set formatting. Instead you insert codes at the beginnings of lines to control alignment, indents, line spacing, headers, and footers. Admittedly, this takes us back to the days of WordStar circa 1979, but it does result in less menu and dialogue-box clutter. You can employ a preview mode to see the effects of your codes before you actually print your document. It also has search and replace and a modestly sized but easy-to-use spell checker and basic mail merge.

For professional writers who rarely format text or for those needing a word processor to prepare text prior to bringing it into a desktop-publishing program, Scribble! remains a good, one-disk choice. Thoreau once proclaimed, "Simplify, simplify, simplify." Scribble! can lay claim to a simple, satisfying elegance. *(The first release of Scribble! was reviewed by Douglas Watt, Jan./Feb. '87, p. 78; version 2.00 was reviewed by the same author, Mar./April '87, p. 94.)*



KindWords

Described by its creators as "The Amiga Wordprocessor," KindWords could in reality be described as yet another Amiga word processor with an unoriginal design and unexceptional text and graphics handling. Yes, you can bring IFF graphics of any resolution into KindWords (although hi-res are converted to medium-res) and display and print them in 16 colors. Graphics can be cropped and resized, but they can be moved only horizontally and text cannot be placed on either side of them. Color graphics also print quite poorly.►

Like many of the other programs under review, KindWords sports the apparently unavoidable Amiga ruler. The KindWords ruler, which can be turned off, provides the usual control over tabs, indents, alignment, and line spacing, although the last is limited to single or double. KindWords also provides headers and footers, a good-sized spelling checker, and merge abilities, and relies heavily on Amiga-key shortcuts.

KindWords uses its own proprietary SuperFonts to print at higher resolutions than the standard Amiga fonts. These consist of Roman 8, 12, 14, Symbol, and Foreign fonts. The limited range of fonts, coupled with the need for special printer drivers, adds up to a rather limited approach to font management. And

Word Processor Roundup:
Comparative Features and Functions

Program	WordPerfect 4.1	VizaWrite Desktop 1.09	Excellence!	Scribble! 2.0
Manufacturer	WordPerfect	Progressive Peripherals	Micro-Systems	Micro-Systems
Price	$395	$149.95	$299	$99.95
FORMATTING				
Headers/Footers?	Yes	Yes[1]	Yes[1]	Yes
Footnotes?	Yes	No	Yes	No
Endnotes?	Yes	No	No	No
Table of Contents?	Yes	No	Yes	No
Indexes?	Yes	No	Yes	No
Multicolumns?	Yes	No	Yes	No
Mail Merge?	Yes	Yes	Yes	Yes
Auto-hyphenation?	Yes	No	Yes	No
MULTITASKING				
Run program in Window?	Yes	Yes	Yes	Yes
Windows: Different Documents?	Yes	Yes	Yes	Yes
Windows: Same Document?	No	No	No	No
GRAPHICS				
Import IFF?	No	Yes	Yes	No
Resize?	No	Yes	Yes	No
Move?	No	Yes	Yes	No
Wrap Text?	No	No	Yes	No
Max. # of Colors Displayed?	N/A	1	8	N/A
Supports Hi-Res Mode?	No	Yes	Yes	No
FONTS				
Supports Amiga Fonts?	No	Yes	Yes	No
Includes Custom?	No	No	Yes	No
Supports Printer Fonts?	Yes	Yes	Yes[3]	Yes
Color Fonts?	No	No	Yes	No
PRINTERS				
Embed Codes?	Yes	No	No	Yes
Preferences?	Yes	Yes[4]	Yes	Yes
Custom?	Yes	Yes	No	No
Supports PostScript?	Yes	No	Yes	No
SPECIAL				
Spell Checker?	Yes	No	Yes	Yes
Grammar Checker?	No	No	Yes	No
Thesaurus?	Yes	No	Yes	No
User-Defined Macros?	Yes	No	Yes	No
Math Function?	Yes	No	Yes	No
User-Defined Glossaries?	No	Yes	Yes	No

NOTES: [1] Displays headers/footers on screen. [2] You cannot edit text that is wrapped around a graphic. [3] Extensive support.

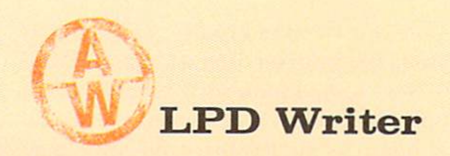
the poor quality of the fonts makes it all hardly worth the trouble, given their irregular inter-character spacing. SuperFonts would be acceptable for only the most casual publications, forcing the user to fall back on resident printer fonts. SuperFonts also occupy a separate disk, requiring disk swapping on one-drive systems during both page composition and printing.

There is nothing fundamentally wrong with KindWords, but neither does it offer a great deal that would impress you. Limitations, such as an inability to view multiple documents and to move data between them, abound. Its modest price, however, may attract those with limited typographical and graphics needs. *(Reviewed by Neil Randall, April '88, p. 20.)* ►



KindWords 1.2	LPD Writer 1.0	Textcraft Plus	ProWrite 2.0.1	TextPro 1.01	BeckerText 1.0
The Disc Co.	Digital Solutions	Commodore	New Horizons	Abacus	Abacus
$99.95	$119.95	$109.95	$124.95	$79.95	$150
Yes[1]	Yes[1]	Yes[1]	Yes[1]	Yes	Yes
No	No	No	No	No	No
No	No	No	No	No	No
No	No	No	No	No	Yes
No	No	No	No	No	Yes
No	No	No	No	No	Yes
Yes	Yes	Yes	Yes	No	Yes
No	No	No	No	Yes	Yes
Yes	No	Yes	Yes	No	Yes
No	Yes	No	Yes	No	Yes
No	Yes	No	No	No	No
Yes	No	No	Yes	Yes	Yes
Yes	No	No	Yes	No	No
Yes	No	No	Yes	Yes	Yes
No	No	No	Yes	Yes[2]	Yes[2]
16	N/A	N/A	7	1	1
No	No	No	Yes	No	No
No	No	No	Yes	No	No
Yes	No	No	No	No	No
Yes	Yes	Yes	Yes	Yes	Yes[3]
No	No	No	Yes	No	No
No	No	No	No	Yes	Yes
Yes[4]	Yes	Yes	Yes	No	No
Yes	No	No	No	Yes	Yes
No	No	No	No	No	No
Yes	Yes	No	Yes	No	Yes
No	No	No	No	No	No
No	No	No	No	No	No
No	No	No	No	Yes	Yes
No	No	No	No	No	Yes
No	No	No	No	No	No

[4] Limited support. N/A = Not Applicable



LPD Writer

LPD Writer annoys you right up front with a prompt to enter a word from the manual when it loads. In this it has the dubious distinction of being the only copy-protected word processor under review. This alone would be sufficient reason not to purchase it. But there's more. The manual is written in a highly offensive manner, sprinkled with such gems as "with me so far? Yes? Great!" and "Seriously though folks!!"

Things do not get much better when you actually start working with LPD Writer. A character-based program, it makes no attempt to integrate graphics or to display and print text in different faces and sizes. Fine, no shame about that, but it also makes little use of the Amiga interface—there are no requesters, only menus of tedious length. The bottom of the screen is dominated by ten function-key areas that you cannot access with the mouse; the program does not support the Amiga keys, either. There are no scroll bars to move around the page; to achieve this and many other actions, you are expected to remember endless Ctrl, Alt, Shift, and Esc key combinations. Beginning to smell like a C-64 port?

In terms of features LPD Writer also does not fare too well. The huge ruler at the top of the screen allows you to use the mouse to set tabs but not indents, and you cannot turn the ruler off. The program does have a spell checker, but it flags virtually every second word as an error, and cannot suggest alternate spellings. It does have basic mail merge facilities, and you can create headers and footers, albeit through some quite bizarre processes peculiar to LPD Writer. Even highlighting text is not simply a matter of clicking and dragging over it. LPD Writer resides on one disk but compactness is about all there is to recommend it. *(Reviewed by Douglas Watt, Dec. '87, p. 82.)*



Textcraft Plus

Textcraft Plus is a mild upgrade of the Textcraft word processor developed by Commodore for the original Amiga release. A quaint README file describes it as "The first TRUE Amiga software program!" This might have been true in 1985, but both this file and the program are seriously in need of an update.

Textcraft Plus makes no attempt to handle fancy fonts or graphics—it is strictly a character-based application using resident fonts and Preferences-supported printers. Because of the Commodore imprimatur, many other word processors have copied its approach—an unfortunate occurrence for the Amiga community, as Textcraft was (and remains) a pretty feeble effort compared to its counterparts on the Macintosh and the IBM PC.

Its most copied feature is without a doubt the placement at the top of the screen of a graphics-based ruler area for setting indents, tabs, alignment, and spacing. You can create and display headers and footers on the screen and perform basic mail merge, but the program lacks a spell checker. Textcraft Plus has an Amiga feel to it, with lots of Amiga key shortcuts and the ability to multitask, but you cannot create windows to display multiple documents.

If Textcraft Plus is short on abilities, it does have a couple of oddball features worth mentioning. A series of animated tutorials is actually quite good; less successful, however, is a series of forms for business letters, term papers, and resumes. These were designed to mirror the real world; instead, they are hopelessly naive and cramped in scope.

Textcraft Plus has little excuse for existence in its present form. If you crave state of the art circa 1985, this bleak, single-disk effort is for you. Personally, I wish Commodore would put it out of its misery.



ProWrite

You would be stretching the truth to call it desktop publishing, but ProWrite is currently the only Amiga word processor that provides more than a token attempt at integrating text and graphics. That it does so in a crisp implementation that makes full use of the Amiga's abilities makes ProWrite a pleasure to use on two-drive systems.

Graphics are ProWrite's forte, so it is no surprise that it can import and display both IFF and HAM images in color or black and white. As images are imported, color values are adjusted to reflect the limitations of color-printer technology. Thus, what you see on the screen is quite close to what your printer will crank out. This is a rare bit of common sense: Why display 4096 colors if your printer cannot reproduce them? Those with noncolor dot matrix printers can also take advantage of this feature. Once imported, graphics can be resized and moved anywhere on the page. And welcome indeed is the ability to place text on the side of graphics, a seemingly simple feat that no other Amiga word processor does capably. You can even wrap text manually around irregularly shaped DeluxePaint images. ProWrite lets you use either the standard Amiga fonts or those resident in your printer. You can display and print text in black or six user-defined colors. Print quality of both text and graphics is better than average; this is actually one of the few Amiga programs of its type that can produce useful work.

While the graphics capabilities of ProWrite certainly distinguish it from its peers, it is no slouch when it comes to handling text. A very large spell checker, search and replace, headers and footers, six ►

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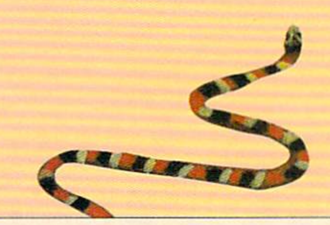
Circle 33 on Reader Service card.

Product Information

WordPerfect 4.1
WordPerfect Corp.
288 W. Center St.
Orem, UT 84057
801/225-5000
$395
512K required.

VizaWrite Desktop 1.09
Progressive Peripherals & Software
464 Kalamath St.
Denver, CO 80204
303/825-4144
$149.95
No special requirements.

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Micro-Systems Software
12798 W. Forest Hills Blvd.
Suite 202
W. Palm Beach, FL 33414
407/790-0770
$299.95
512K required.



Scribble! 2.00
Micro-Systems Software
12798 W. Forest Hills Blvd.
Suite 202
W. Palm Beach, FL 33414
407/790-0770
$79.95
No special requirements.

KindWords 1.2
The Disc Company
3135 S. State St.
Suite 300
Ann Arbor, MI 48108
313/665-5540
$99.95
512K required.

LPD Writer 1.00
Digital Solutions
30 Wertheim Court
Unit 2
Richmond Hill, Ontario
Canada L4B 1B9
416/731-8775
$69.95
512K required.

Textcraft Plus
Commodore Business Machines
1200 Wilson Dr.
West Chester, PA 19380
215/431-9100
$109.95
512K required.

ProWrite 2.0.1
New Horizons Software
PO Box 43167
Austin, TX 78745
512/328-6650
$124.95
512K required.

TextPro 1.01
Abacus
5370 52nd St. SE
Grand Rapids, MI 49508
616/698-0330
$79.95
512K required.

BeckerText 1.0
Abacus
5370 52nd St. SE
Grand Rapids, MI 49508
616/698-0330
$150
512K required.

page-numbering styles, and a ruler with increments that include picas, points, and inches provide good control over document formatting. Add to this ProWrite's speed, multitasking, windowing, and that intangible "feel" common to the best Amiga programs, and the result is superior graphics-and-text integration, good color control, and respectable text abilities. *(An earlier version of ProWrite was reviewed by Louis R. Wallace, Sept./Oct. 87, p. 70.)*



TextPro

My selection for the least successful word processor for the Amiga is TextPro. Billed as "The Complete WordProcessing Program for the Amiga," TextPro is really an uninspired little effort that makes poor use of the Amiga and turns text creation into a rather unpleasant task.

TextPro is a character-based word processor that makes a feeble stab at handling IFF graphics. Images are both displayed and printed in a primitive manner, and while it is possible to place text beside a graphic, it can then no longer be edited.

You can set tabs by clicking on a line at the top of the screen, but I would hesitate to call this a ruler area. You set paragraph indents, line spacing, and alignment not with the usual Amiga ruler icons, but through menus; the control this arrangement provides is quite limited—for example, there is no right paragraph indent. And while you can create headers or footers, they do not display on the screen. The whole thing has a very marginal feel, lacking windowing and a spell checker and relying on its own printer drivers for output.

To be fair, TextPro tosses in a few uncommon features, such as a separate program that saves any Amiga screen as an IFF file, the ability to program the function keys, and a separate mode for creating C programming code. Despite this, TextPro has little going for it. Unless your text-handling needs are simple and you do not mind putting up with its harsh feel and severe limitations, TextPro is not for you. *(Reviewed by Neil Randall, April '88, p. 20.)* ►

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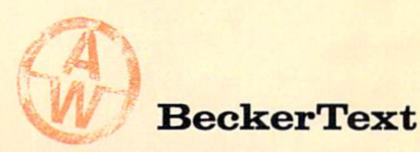
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Circle 197 on Reader Service card.



BeckerText

BeckerText is an enhanced version of Abacus' TextPro that, while containing added text-handling abilities, does nothing to alleviate many of its limitations. It has the same ugly screen display, the same rough edges, and the same primitive approach to graphics.

It is still a character-based word processor that relies on custom printer drivers. Thus, although it claims to support laser printers, it does not supply any laser driver, leaving you either to wade through pages of technical specifications or to request that Abacus create a driver for your printer. BeckerText extends printer support to the point that you can now assign up to ten of your printer's fonts to font definitions that can (theoretically) be applied to text. Despite claims of "real WYSIWYG (what-you-see-is-what-you-get) formatting," you will not see these fonts displayed on the screen, and you cannot mix fonts on a line.

You can now create indexes and tables of contents, but these are generated at print time in a separate file—an inconvenience I could live without. A spell checker has been added, but it flags far too many correct words and does not suggest alternative spellings. While it has the option to check spelling as you type, its eagerness to flag words will slow your writing to a crawl. In theory, you can now open multiple windows, but the process is so awkward and memory inefficient that even with 1MB of memory, it is a trial to make use of this feature. More potentially useful are the new math and multicolumn abilities.

BeckerText offers enough features to be taken seriously as a character-based word processor with marginal graphics handling. Too many of these features, however, are primitive enough to make formatting long or complex documents a frustrating experience.

Our roundup is finished, but before we disperse these doggies back out into the herd, remember this: Although the quality and versatility of these packages vary considerably, the most important factor to weigh is what kind of tasks you need a word processor to accomplish for you. A program with simple, basic features and a modest price tag may be a winner for the person with limited document-creation needs, but a recipe for frustration for the person with sophisticated, heavy-duty text and graphics capabilities. ■

Chris Dickman is the Director of Desktop Documentation Services, a Toronto firm providing writing, editing, and design services using desktop publishing technology. Write to him c/o AmigaWorld, *Editorial Dept., 80 Elm St., Peterborough, NH 03458.*

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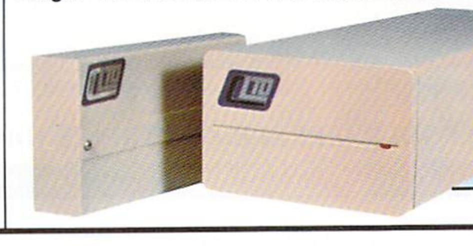
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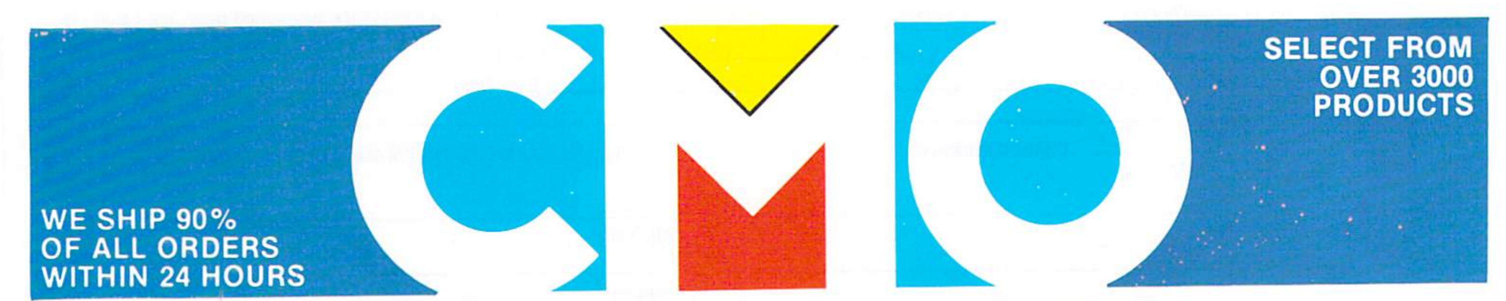


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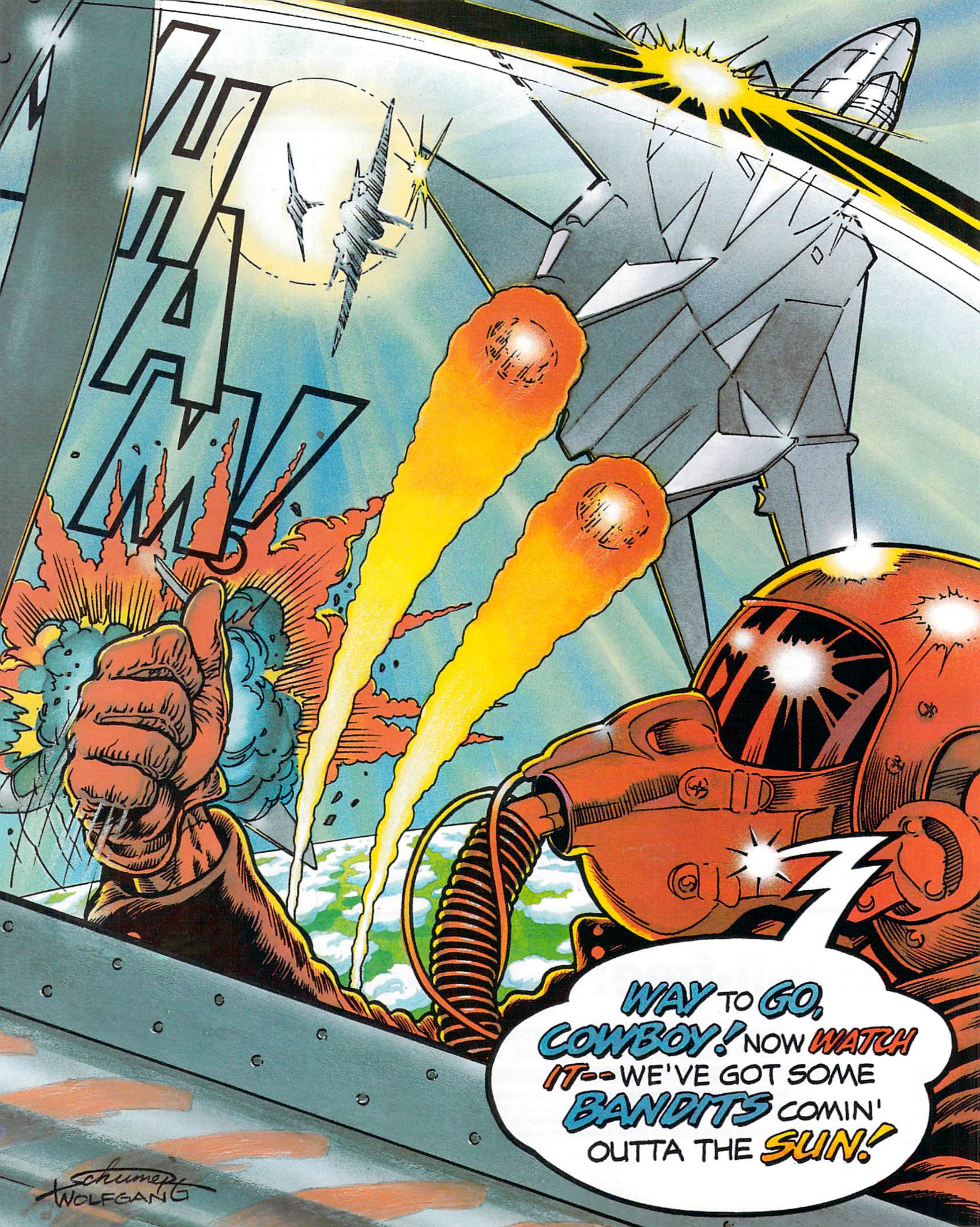


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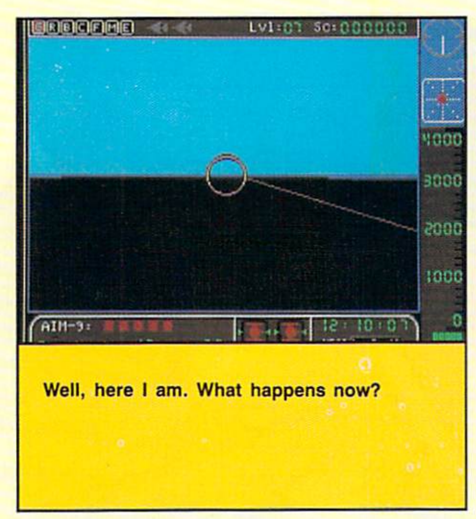
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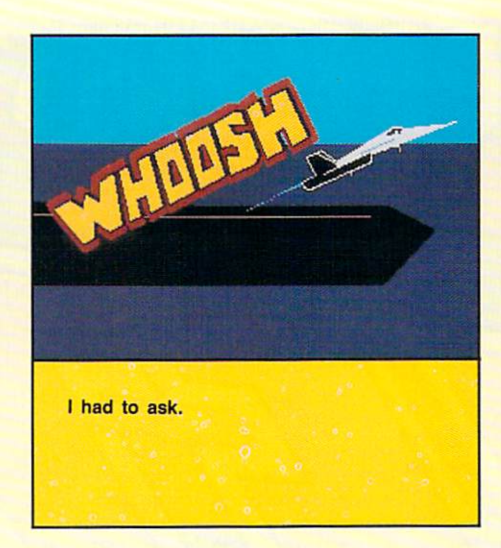
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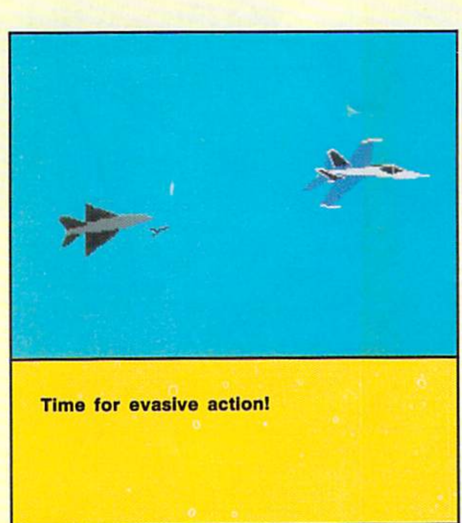


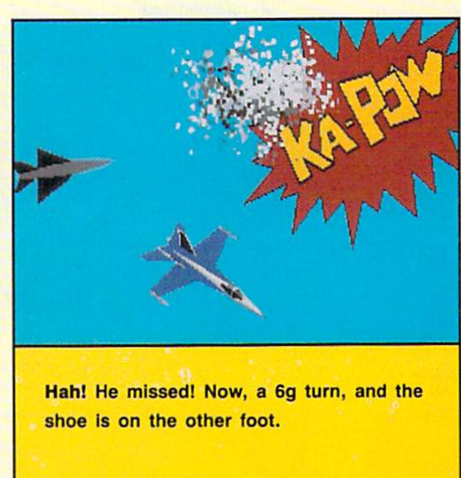
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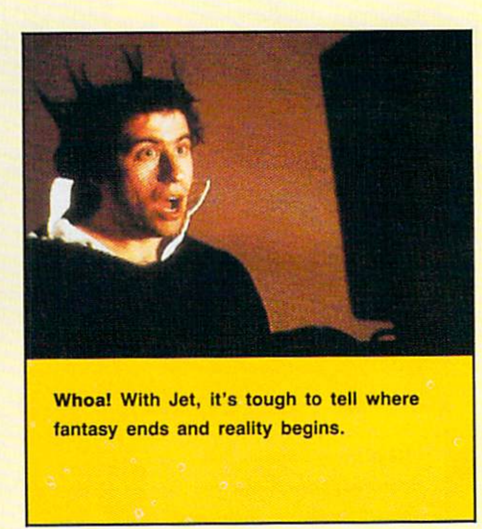






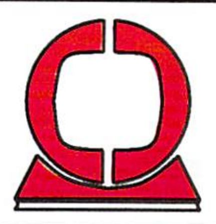






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Exploring AmigaDOS 1.3*

By Bill Catchings and Mark L. Van Name

Still hot on the trail of AmigaDOS 1.3, Team info.phile shows you in Part 3 of its mini-series how to put commands in memory with the RESIDENT command.

**Editor's Note: To get the information on version 1.3 to you as quickly as possible, the authors have had to use a "gamma" version of AmigaDOS 1.3. A gamma version is one that Commodore circulates to developers and a few other groups so that those groups can see what's coming and help shake out any bugs. It is the last unofficial release before the software hits your dealer's shelves. Most likely, the final version will have the same new CLI commands as this gamma version,* but *Commodore still could make some changes before it releases the final version. To be safe, when you buy a copy of version 1.3, plan to spend a few minutes verifying that everything works as it is described here.*

THE RESIDENT COMMAND satisfies a need that many CLI users have felt for a long time, the desire to avoid the disk accesses that it takes to read a command before AmigaDOS actually starts executing it. But before we get into the RESIDENT command, we have to warn you that you cannot use it from the normal CLI. To use it you must work with a major AmigaDOS 1.3 addition—a second, alternative CLI known as the Shell.

The Shell provides many features that long-time CLI users will appreciate. There are so many new features that we will leave most of them for our next column and discuss only the RESIDENT command here. Despite the many new abilities, however, running the Shell is as easy as running the CLI. When you open your Workbench 1.3 disk, you will see an icon for the Shell. Just double-click on it and a CLI-type window will appear. The main differences from the normal CLI are visual. For instance, the prompt now includes not only the CLI number, but also the current directory. The Shell runs the same startup file, S/CLI-STARTUP, that we mentioned in our last column. It runs all of the regular CLI commands.

If for some reason you need the old CLI, don't worry: It's still where it used to be, in the SYSTEM drawer on the Workbench disk.

Taking Up Residence

In one of our earlier columns, we showed you the classic way to put commands in memory [see info.phile, "The Disk That Wasn't," April '88, p. 63]. You copy some or all of your commands from the Workbench C directory to a directory in the RAM: disk, and then ASSIGN the logical device name C: to that RAM: directory. Then AmigaDOS looks for its commands in RAM:C instead of Workbench:C, and you skip the disk reads.

This solution, however, wastes memory with commands you seldom need. The RESIDENT command is often a better way to solve this problem. It lets you put commands in memory, but it does not use the RAM: disk. Rather than storing the commands in a directory, it manages them itself, keeping them on an internal "resident list." The only visible sign is the decreased amount of available memory.

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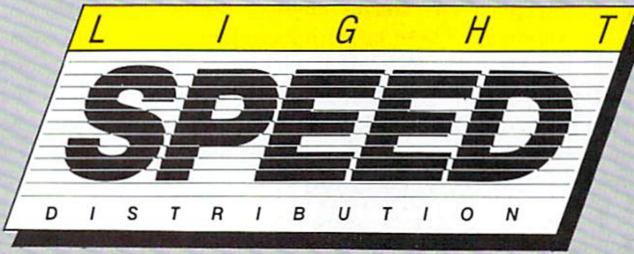
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RESIDENT <command name>

will do the trick. If you are in the C directory, you only have to supply the simple file name of the command, as in

RESIDENT COPY

If you are in another directory, however, you must supply the full path name of the command, such as

RESIDENT DF0:C/COPY

When you make a command resident with either of these approaches, the command will be given the same name that it has on the disk. (The examples in the rest of this column assume that you are in the C directory.)

You do not have to stick with the original names of commands. To give a memory-resident command a new name, supply the new name as the first argument to RESIDENT, and then give the command's file name. For example

RESIDENT MYCOPY COPY

sets up a memory-resident copy command that you can then use by the name MYCOPY.

RESIDENT will let you give any name you want to any command. You can even use the same resident name twice in a row, and it will just replace the first memory-resident command with the second. For example, if you first enter

RESIDENT C COPY

and then later enter

RESIDENT C CD

the next time you use C, it will be the CD command, not COPY.

Options

RESIDENT also offers several options. By entering

RESIDENT <resident name>
<command name> ADD

you make that command resident, or add it to the resident list. You can also enter

RESIDENT <resident name>
<command name> REPLACE

to replace an existing memory-resident command. These last two examples, using ADD and REPLACE, yield the same results as the two preceding examples. The ADD and REPLACE options are not essential, and are useful mainly as reminders of your intent.

The REMOVE option, however, *is* important, because it lets you get rid of an existing memory-resident command. To remove the MYCOPY command that we made resident earlier, enter

RESIDENT MYCOPY REMOVE

List of Residents

You can also see the list of memory-resident commands by entering RESIDENT with no arguments. We need to explain a few things, however, about what you get when you enter this command. If you start the Shell on a fresh-from-the-wrapper Workbench 1.3 disk, and then immediately enter

RESIDENT

you will see the following display:

NAME	usecount
Execute	1
CLI	SYSTEM
FileHandler	SYSTEM
Restart	SYSTEM
CLI	SYSTEM

The logical questions, of course, are what are these memory-resident commands, where did they come from, what is a usecount and what kind of a count is SYSTEM?

Let's start with usecount and then take the commands in order. Usecount is the number of different processes that are currently using an item. As you sit at your Amiga, running only one Shell, this count may seem pretty silly. Remember, however, that the Amiga is a multitasking machine, and you could run many copies of the Shell. All of those Shells would share the memory-resident commands, just as they would share the other resources of your Amiga. Two or more of them could be running the same command at the same time. If you were using a memory-resident command in one Shell and then tried to remove it in another, you could hurt the first Shell's activity. AmigaDOS uses the usecount to keep this from happening. It adds 1 to a memory-resident command's usecount every time a process uses it, and subtracts 1 when that process finishes with it. You cannot remove a memory-resident command unless its usecount is 1.

If that rule seems a bit strange to you, join the club. If a memory-resident command's usecount is 1, doesn't that mean

that one process is using it, and that, therefore, you should not be able to remove it? Sadly, no. When no process is using a command, its usecount is 1, not 0 as you might expect. The usecount goes to 2 for the first process that uses it, 3 for the second, and so on. That explains why the EXECUTE command, which you were not using when you got this display, has a usecount of 1.

Commodore chose to display 1 rather than 0 in this case because it more accurately reflects the way they implemented the RESIDENT command. AmigaDOS maintains an internal data item, the "resident structure," for each memory-resident command. That data item has a usecount field of 1 for all memory-resident commands, hence the display of 1. Still, we think that Commodore should have gone with a 0 usecount for memory-resident commands that are not in use, because it would make more sense to most users.

Despite what we just said, you will notice that none of the other usecounts in the display is even a number; instead, you see just the word SYSTEM. This term comes from another RESIDENT option of the same name. If you add the SYSTEM option on a RESIDENT command, it lets you make resident a program that you cannot directly run. You can directly execute only memory-resident commands whose usecount is a number. This feature lets AmigaDOS install resident code other than commands, so that you can access that code quickly. The SYSTEM memory-resident commands in the above display are resident code that you cannot directly call. CLI is the actual code of the Shell, while FileHandler and Restart are internal programs that the Shell requires.

So, why two entries for CLI? From our point of view in using the system, there is no good reason for this. We suggest you ignore those two entries, along with FileHandler and Restart, and pay attention only to the ones that represent memory-resident commands that you can call. For those who need to know, here's an explanation. The Shell needs to maintain a fair amount of state. State is information that the Shell needs for its own functioning. Because, like anything else resident, it must be pure code, the Shell cannot maintain that state in global variables. It also must maintain state for each of the memory-resident commands. The first CLI entry represents the Shell code segment that NEWCLI commands will use to start other Shells. The Shell uses the second one for its own state and extra code segments. As to why all of this information can't fit in one entry, the best we could find out from Commodore was that some subtle incompatibilities with a popular compiler's debugger made the second entry necessary.

One more piece of the mystery remains: the source of these entries. As we implied above, FileHandler and Restart appear "magically," because the Shell needs them. Ditto for the second CLI entry. You put the first two entries there yourself, however, without even realizing it. If you look in the standard AmigaDOS startup file, S/STARTUP-SEQUENCE, you will find the following two RESIDENT commands:

```
RESIDENT CLI L:SHELL-SEG
   SYSTEM PURE
RESIDENT C:EXECUTE PURE
```

The first one loads the program SHELL-SEG under the name CLI. SHELL-SEG is the code that implements the shell. Note the SYSTEM option on this command, so that you cannot directly call the CLI. (Remember, to start a CLI in AmigaDOS, you use the NEWCLI command.) The second line loads the EXECUTE command.

Residential Restriction

You've probably noticed that we have twice now danced around the word "pure." This word is tied to one very important restriction of the RESIDENT command: you can make resident only those commands and programs that are pure.

A command is pure if it is both "re-executable" and "reentrant." To be re-executable, a command must let you run it over and over without reloading it from disk. This basically means that it has to clean up its own internal, in-memory mess when it finishes so that it does not encounter that mess when you run it again. Otherwise, you would not be able to run a memory-resident command more than once. To be reentrant, a command must allow you to interrupt it and then restart it later from exactly the same point. Memory-resident commands must have this ability, because several Shells could be running them simultaneously, with each one at a different ►

point in the execution of the command. Previously, when you were working with commands on disk, if you ran the same command in more than one CLI, each CLI loaded its own copy of the command from disk. Because all Shells share the same memory-resident commands, those commands must be reentrant.

The easiest way to find out if a command is pure is to check its protection bits. In our last column we mentioned that AmigaDOS 1.3 includes several new protection bits, including "p" for pure. To see which commands Commodore has designated pure, go to the C directory and enter

```
LIST
```

You will see the usual "rwed" protection bits next to each command. You will also see "p" next to most of them. You can make resident any command whose protection bits include "p."

Don't worry too much about this restriction. Of the many CLI commands in the C directory, only the following seven do not have their pure protection bit set:

```
BINDDRIVERS
FF
LOADWB
REMRAD
SETALERT
SETCLOCK
XICON
```

If you're like us, you use most of these commands only when you boot, if at all, so this is no big loss. If for some reason you do want to make one of these resident, and you try to do it in the usual way, as in

```
RESIDENT FF
```

you will see the messages

```
Pure bit not set
Cannot load FF
```

But all is not lost. You can force RESIDENT to load your command with the PURE option. If you then enter

```
RESIDENT FF PURE
```

it would respond

```
Pure bit not set
```

but it would load FF as a memory-resident command. You're not out of the woods yet, however. Commodore suggests that you then conduct a test to find out if the command you just forced RESIDENT to accept is really pure. The test is simple: Use the command twice in a row. If it succeeds, the command is probably pure. (This test won't guarantee that the command is pure, but it's as close as you can come without seeing the command's internal code.) If a command is not pure, you'll know it after the second time you use it, when your Amiga will hang, reboot, or even show you the Guru.

Next Time: On to the Shell

We mentioned the Shell briefly in this column, but next time, we will cover it in detail. While you can use it just as a CLI that happens to offer the RESIDENT command, it also contains many other useful new features. ■

Mark L. Van Name and Bill Catchings are contributing editors to AmigaWorld. *Write to them at 10024 Sycamore Rd., Durham, NC 27703.*

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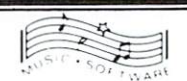
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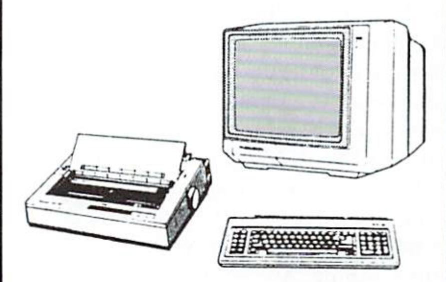
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from p. 18

tention was given to making them Amiga programs. There would be no need to lose the integration, and modules could communicate via message ports. As it stands, AssemPro is overshadowed by six other assemblers.

Picking Up the Pieces

Three of the packages—Devpac, CAPE, and AssemPro—come with built-in text editors, none of which is spectacular. They work, but the average user will probably want something better. All but AssemPro allow you to import any text editor you choose.

Only Lattice Asm, CAPE, and Aztec support the object-file magic the linker needs to patch together multiple base-relative modules. Base-relative addressing reserves an address register to point to the middle (base) of the data area, and uses short relative references to dramatically reduce program size. Any of the assemblers can fake this, but only for all-assembly programs.

Devpac is perfect for small stand-alone assembly work, and for beginners. CAPE is the next step up in power.

If 68020 or 68881 code is what you want, Aztec C's assembler is the one for you. Remember, though, that using it locks you into the Aztec environment.

If you plan on creating assembly modules for use with another language, you will need to match capabilities. For use with Aztec C, the Aztec assembler is the only practical choice. For Lattice C, the Lattice assembler is fine to start with, but once you outgrow its capabilities you may want to upgrade to CAPE. Any assembler is suitable for use with BASIC. You will probably need to create object files in Amiga Format for use with any other languages (such as Modula-2), which puts Aztec and AssemPro out of the running. Any of the others should do, though, but I recommend checking with the language vendor to be sure.

Assemblers run the gamut from beginner- to expert-oriented, from fully-compatible to incompatible, and from bug-free to buggy. There are many possible solutions to the assembly riddle; look carefully at your present and future needs to determine which will complete the picture for you.

Macro Assembler
Metacomco plc
distributed by Southern Technologies
3212 Beltline Rd., Suite 301
Dallas, TX 75234
214/247-7373
$99.95
No special requirements.

Devpac
HiSoft
distributed by
Manx Software Systems
One Industrial Way W.
Eatontown, NJ 07724
800/221-0440
$99.95
No special requirements.

CAPE 68K
Inovotronics Inc.
11311 Stemmons Freeway, Suite 8
Dallas, TX 75229
214/241-9515
$89.95
No special requirements.

C Compiler 4.0
Lattice
2500 S. Highland Ave., Suite 300
Lombard, IL 60148
312/916-1600
800/533-3577
$200
No special requirements.

Aztec C68K/am-p
Manx Software Systems
One Industrial Way W.
Eatontown, NJ 07724
800/221-0440
$199
No special requirements.

AssemPro
Abacus
5370 52nd St. S.E.
Grand Rapids, MI 49508
616/241-5510
$99.95
No special requirements.

3-Demon

A designing little devil.

By Louis Wallace

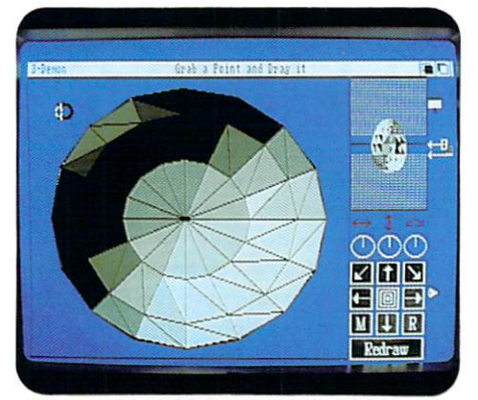
3-DEMON IS A powerful program that helps you design complex three-dimen-

sional objects. While 3-Demon is not capable of actually rendering objects, it supports most popular 3-D formats, and effectively passes the depiction job to those specialists.

Unlike the object editors supplied with most rendering programs, this one is smooth and fluid. 3-Demon's tools are well presented and easy to use, and the program employs Intuition-style menus and icons; you can almost immediately begin working.

Tinker And Toy

3-Demon can load some objects in one format and save them in another. You can easily exchange VideoScape (Aegis) and Sculpt 3D (Byte by Byte) files, for instance, as 3-Demon loads and saves in their formats. For Forms In Flight (Micro Magic), Silver (Impulse) and others, however, it supports object saving only. If



Just grab and drag to reshape this object.

you generate an object for use in the programs that 3-Demon has just a save option for, be sure to save the graphic in 3-Demon's own format, so you can load and edit it later if need be.

Triangles are your main building blocks. While the program allows you to design objects using lines and polygons as well, you inevitably end up creating triangles with them. Moving a point, line, triangle, or object is as easy as selecting a menu option, and grabbing and dragging the piece with the mouse. You can behold your object as a wire-frame model, in simple color panels, or in shades of gray to give you an idea of its true three-dimensional nature. You can also opt for a pair of flat views: one aerial and one side perspective.

The well-written manual describes the many options available for manipulating objects. Using the scale, rotate, and move functions (or any combination of them) under the transformation menu, you can induce all kinds of changes. You can rotate your creation in the X-, Y-, or Z-axes in steps of any number of degrees. 3-Demon will memorize your original position so you can recall it instantly if your experiments prove unsuitable. The program gives you full control over your object's perspective, too, so you can make it appear close or far away. You can set the origin and scale of the view independently in all three axes.

The Spin option allows you to draw part of an object freehand, then rotate it around its beginning and ending points to create a solid object. You can subdivide it into any number of sections; you're limited only by RAM.

An option called Slice can raise flat surfaces, by cutting and stacking. You draw an outline of the shape you want raised. Then, you define the surface's final height by specifying the number of slices you wish to stack and the distances between them. Slice then layers clones of the shape in layers to achieve the height you defined.

Beneath The Surface

One very powerful aspect is its treatment of surfaces. You can define a surface for any point, line, triangle, or object from a box containing all the various possibilities. The options include full control of 4096 colors (although 3-Demon does not work in HAM mode, you can import to ray-tracing packages) through red, green, blue, and hue, saturation, and intensity knobs. You can also control the amount of ambient light (light emitted by the object), diffuse reflection (ranging from shiny to dull), specular reflection (degree of gloss), "metallicity" (3-Demon allows mirrored qualities), reflection (amount of reflected light coming from surface), transparency (how much light passes through the surface) and refraction (the degree light bends as it passes through a transparent object). Once you have defined a surface, you can name it and save it for later use.

3-Demon cannot display all the surface properties it can create, but they will appear when the object is rendered with a supporting package. It can display twelve colors, but must approximate more than that.

Object Hierarchy allows you to combine several objects into one view and ►

relate them. You can designate one object as a parent, with one or more child objects. When you rotate or otherwise transform the parent, the child objects also change. You can create any number of generations, and all children are effected when you alter an ancestor (transforming a child object has no effect on the parent). This relationship is a powerful facet of the editor, and one you will quickly appreciate.

Divide, quantization, combine, drag, delete, flip, grid, copy, move, resolve, and center are some of the many other options. 3-Demon offers so much, and is so good, you may wonder how you got along without it. Once you try it, you probably won't use your rendering package's editor for anything beyond simple adjustments. If your 3-D program is compatible, 3-Demon may be just what you've been wishing for.

3-Demon
Mimetics Corp.
PO Box 1560
Cupertino, CA 95015-1560
408/741-0117
$99.95
512K required.

ProGEN

Sync graphics and video.

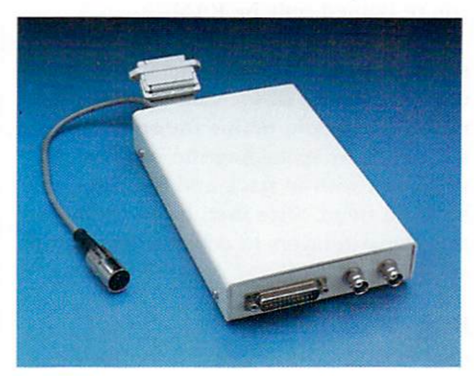
By Wayland Strickland

PROGEN FROM Progressive Peripherals & Software offers basic sync functions with a no-frills approach.

Hooking up the 8 × 4¾ × 1-inch ProGEN can be confusing. The genlock links with your Amiga via a 25-pin female connector with two pins amputated. (no one currently manufactures the appropriate 23-pin connector). ProGEN's 1½-inch ribbon cable does not allow enough slack to set the genlock down comfortably once you attach it. I ended up hanging the unit by its cable behind the computer, an unadvisable position at best. To plug in the monitor cable, ProGEN supplies a standard male 23-pin connector. You will need an inexpensive adapter (available at an electronics store) to join your home video equipment to the external video source and combined (keyed) output BNC connectors. The input and output plugs are not labeled; fortunately, they are well documented.

Eccentric

ProGEN will genlock to any NTSC (National Television Standards Committee) interlaced video source. When you start the unit, the portion above the very top of both the computer's display (above the menu bar) and ProGEN's composite video output will skew to the left. While you can correct the problem with the simple set-up procedure described in the manual, careful factory adjustments would eliminate the need for this. Even more annoying, the graphics keyed over the external video are to the right of



ProGEN's connector comes up short.

center. According to the manual, you can fix this by adjusting Preferences' window center gadget. The adjustment works in most cases, but a few programs (including DeluxePaint II by Electronic Arts) will not acknowledge the center setting, while some HAM-related software crashes the system if you set the center gadget too far in either direction.

ProGEN has no built-in sync generator and must sync to an external video source. Without an external sync, ProGEN's signal is unusable. You can use a video camera with the lens cap on to generate the required blackburst. With the camera connected, you can transfer graphics that do not require external video to tape. If the external source's video level changes suddenly, the genlock loses sync. ProGEN tracks the video and chroma levels, as closely as possible, matching the computer's levels to the external levels. ProGEN is more sensitive to a potential loss of sync than other genlocks I have used.

I tested ProGEN's composite video output in a television studio with a set of color bars, a waveform monitor (to verify video levels), and a vectorscope (to check color level and tint). With the house sync generator supplying blackburst to ProGEN, the waveform monitor showed the white bar at 90 IRE (a video-level measurement standard developed by the Institute of Radio Engineers), black at 7.5 IRE, chroma at 30 IRE to −30 IRE, and sync at −40. All video levels were within standard RS-170A tolerance; however, the chroma was slightly oversaturated. The vectorscope showed ProGEN's colors as right on target.

ProGEN functioned properly when I connected it as a standard video source (still using the house sync generator) to a Sony SEG-2550 broadcast switcher, although the subcarrier (tint) was approximately 60 degrees out of phase. I was able to alleviate this common problem by inserting a video delay, which allows for adjustment of the subcarrier phase, between the sync generator and ProGEN.

Adapting to Software

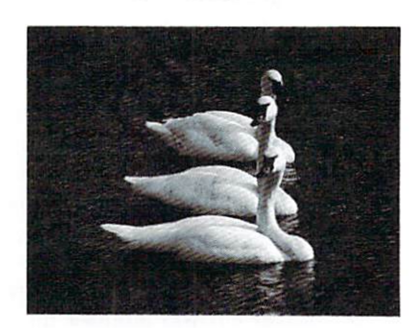
ProGEN communicates with its companion software via a 10½-inch cable with a female five-pin DIN plug. Because the Amiga does not have a port for this cable, you must construct an adapter—the Mode Control cable—to hook into the parallel port. On one end, the cable has a male five-pin DIN plug with three pins soldered, on the other end is a male or female (depending on the Amiga model) DB 25-pin connector with three pins soldered.

A five-pin DIN connector is supposed to accompany ProGEN. If, like me, you did not receive it, you can pick one up at the electronics store when you purchase your other supplies—a DB 25-pin connector, a connector hood, and four-conductor phone wire. Follow the manual's instructions to build the cable. If you prefer, you can buy a completed cable ($15.95) from Progressive.

You can bypass the Mode Control cable by keying graphics that do not use color 0 on the Amiga's screen. The companion software, however, offers four operation modes in addition to Background, or color 0, mode. Video Only mode shows external video alone, without graphics keyed over it. Amiga mode displays graphics only. Foreground I permits colors other than color 0 to become transparent, while Foreground II restores opaqueness to the colors used in ►

QUALITY

CygnusEd Professional



"Der Neue König Der Editoren"
("The New King of Editors")

68000er, February 1988

CygnusEd Professional By CygnusSoft Software
Published By ASDG Incorporated

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Ease Of Use
•Mouse based "Turbo-Scrolling" and/or Scroll Bars (on left or right side of screen). •Whenever the keyboard is used, the mouse cursor becomes invisible and reappears when the mouse is touched. •Requesters and dialogs position themselves under your mouse (no more mouse fatigue!). •Intuitive menu organization. •Keyboard short cuts for most menu functions.•Asynchronous printer spooler lets you edit while you print. •Autosave function will automatically save your work after user defined time periods. •User selectable color palatte. •Any function or keypress can be repeated a specified number of times (automatically). •User definable "bookmarks" for quickly moving between sections of a file. •Will create icons for text files if desired. •Optional stripping of carriage returns for files brought from non-Amiga computers.

International Support
•Supports NTSC and PAL (in both interlace and non-interlace). •Supports international keymaps including "dead key" accents.

General
•Requires 512K and KickStart 1.2 or later. •Compatible with A500, A1000 and A2000. •Not copy protected. •Supports Preferences style printer capabilities such as underline, italic, bold, superscript, etc. •Includes the excellent public domain document formatter, PROFF, by Yigit and Tress.

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PERFORMANCE

Circle 65 on Reader Service card.

Foreground I. The software comes in two versions. ProGEN1 uses the function keys F1 through F4 to control the modes, while ProGEN2 employs combinations of the Control key and number keys. To automatically enter interlaced mode, include the third program, SETLACE, in your A500's or A2000's startup-sequence. The well-written manual includes a tutorial on the software.

This genlock is geared toward video amateurs and semi-pros. On the plus side, ProGEN cleanly keys graphics into any enternal video source, does not degrade the incoming video's picture quality, and maintains picture integrity with or without graphics keyed in. On the minus side, characters in an 80-column display are surrounded by a chroma ring (rainbow pattern) because of the low resolution in NTSC composite video. You can use ProGEN in a professional studio to generate backgrounds, but the absence of a key out precludes you from using it with a switcher as part of a downstream keyer. You could route the video output of the switcher though ProGEN to a videotape recorder, but this would prevent you from using fades or dissolves in the graphics.

ProGEN performs quite well. If you don't mind dangling your genlock off the back of your computer and building or buying an extra cable, ProGEN is a decent investment.

ProGEN
Progressive Peripherals & Software
464 Kalamath St.
Denver, CO 80204
303/825-4144
$449.95
No special requirements.

SupraModem 2400

Not half baud.

By Sheldon Leemon

SPECIES IN THE computer-hardware genus seem to evolve from bulky and costly into smaller, less-expensive products. The SupraModem 2400 is a prime example of this trend. While 2400-bps (bit per second) modems used to cost up to $700, Supra Corporation has cracked the $200 price barrier with the compact (1″ × 4.5″ × 6.5″) SupraModem. With its brushed-aluminum case and black faceplate, this unit looks like a Hayes modem that shrunk in the wash.

The folks at Supra did scale down the size and cost of their product, but they didn't wring out out any of the features you would expect from a good modem. The back panel is crowded with connectors for the phone outlet, telephone, RS-232 serial cable, and the wall-mounted power pack. Eight LEDs on the front panel indicate the status of High Speed, Auto Answer, Carrier Detect, Off Hook, Receive Data, Send Data, Terminal Ready, and Modem Ready conditions. A push-button power switch is conveniently located on the front panel, and an internal speaker lets you monitor the progress of your calls. The hardware is covered by a one-year warranty.

Because most terminal and bulletin-board programs use the Hayes Smartmodem command set, Hayes compatibility is of concern to many. SupraModem fares well on this score, supporting over 70 command sequences that start with ►

the Hayes AT attention code. With these instructions, you can tell the modem to dial a number, answer the telephone, and disconnect a call, among other tasks. SupraModem also supports most Hayes S-register settings, which let you determine such things as how many times to let the phone ring before answering and how long to wait before recognizing a carrier tone. As with most 2400-bps modems, this one allows you to save a number of settings in nonvolatile memory, so they will be preserved even while the power is off.

Watch And Wear

The SupraModem documentation is quite comprehensive, containing technical details of operation, practical instructions for use, and an index. Much of the technical detail is misplaced in the front of the manual though, and most practical instruction is toward the back. Information on answering calls and dialing, topics most beginners want to know about right away, is not presented until Chapter 6. Also, the technical jargon is often unneccesary and intimidating. Still, the manual gives you what you need. It explains how to determine whether your modem is working correctly, and what the status lights mean. A detailed trouble-shooting guide lists common problems and how to correct them, and complete sections on the AT command set and S-registers are included. You even get a fold-out reference card.



Call on SupraModem for speed and economy.

The modem is designed for use with any computer that has a standard RS-232 serial port, but Supra also sells versions configured specifically for the Amiga 1000 (the 2400AG) and the A500 and A2000 (2400AM) for an extra $40. These packages provide the necessary serial cable and a version of Access!, a popular shareware terminal program.

Because sound and animation files are so large, the fast 2400-bps transmission speed is almost a necessity on the Amiga, and is quickly becoming standard for telecommunications. The SupraModem 2400 will provide the opportunity for many Amiga owners to step up to 2400 bps for a 1200-bps price.

SupraModem
Supra Corp.
1133 Commercial Way
Albany, OR 97321
503/967-9075
$179.95
Serial cables required.

Source Builder

Automatic programming.

By Jim Fiore

MAYBE SOMEDAY, PROGRAMMING will be a simple matter of giving your

Amiga an outline and letting it grind out the code. Software Integration Solutions takes a step in this direction with Source Builder, a program that automates source-code development.

A master disk and a data disk comprise the program. Neither a compiler nor an interpreter is included; you can use it with almost any language. Source Builder also handles ASCII files, enabling you to manipulate many CAD and database projects, as well as program comments and remarks on straight text.

Source Builder approaches development automation in two ways. The extensive macro-substitution system lets you assign one name to a group of commands. Macro substitution literally expands your source code; it does not write the original lines as separate functions or procedures. While the C language provides a facsimilie— a considerably less-powerful macro preprocessor—most languages do not offer any form of macro substitution.

The second half of Source Builder, Parts Definition, allows you to clone segments of code while making substitutions for specified variables. The idea here is to save you from relisting one order that is largely the same as another. Source Builder lets you use two kinds of building blocks to accomplish this: configurations, the broadest unit from which source code is derived, and segments—procedures or subroutines within configurations. You set configuration and segment statements off from the rest of your code with two different styles of brackets (you can redefine the symbols). A typical directive may translate to: "take the following chunk of code, give me five copies of it, initializing the second variable each time with values, in consecutive order, from this accompanying list."

The Hard Hat Area

Once you have created a file, Source Builder must analyze it and turn it into source code. Because Source Builder relies on Amiga Basic for source-code creation, the program must encode files before building them. (Amiga Basic is not included on the master disk; you must install it from Workbench Extras.) The encoding process packs lines into PRINT# statements; upon execution code is sent to various files. While Amiga Basic does afford you the control of a high-level language, the two-step process is not speedy. If you're impatient with your current compile/link times, you may find Source Builder excessively slow.

You must invoke the program directly from the CLI. When you do, a small window will open. This window's sole purpose is to provide menus, among them a Project menu and menus for configurations, segments, run times, and the encode/build process. Some menu items overlap in function. For example, there is really no need for the List item, as you can accomplish listing through View. And while View allows you to display source file using an editor, Edit does essentially the same thing.

Making a selection calls up a file requestor. This requestor, however, lacks space for entering a directory or drawer name. If you want to list the configurations in a different directory, you must go to the Project menu, change the logical paths, and then pick up where you left off under Configurations. The file requestors seem to have minds of their own. The knob on the scroll slider, for ►

instance, does not correctly indicate your position in the file, and it fails to contract and expand to reflect file size. This knob sometimes disappears when you drag it with the mouse (it still works, it's just invisible). Also, your initial click on the slider reorders the files displayed.

The manual is wordy yet vague in spots. Source Builder documents a number of examples included on disk. The package takes the best of these, a C-language menu generator, only half way though; it is documented, but does not reside on disk. One short chapter is devoted to ADA programming applications, which I find curious because I have never seen an ADA development system for the Amiga. I was stopped dead in my tracks after about the fourth or fifth step in the tutorial; it seems that source file references are included as filenotes, but that the example files do not provide filenotes. I was able to proceed only after fixing it myself.

Source Builder does not tremendously reduce code except in extremely-repetitive programs. A sample of C menu code came in at around four pages; the required Source Builder code was also approximately four pages.

Source Builder succeeds in automating code development, but it's pricey. An editor with cut and paste facilities requires no more typing in many applications, works directly on the source code, and will not take up extra space on your development disks.

Source Builder
Software Integration Solutions
16496 Bernardo Center Dr., Suite 205
San Diego, CA 92128-2442
619/451-3094
$149.95
512K required.

VIDEO EFFECTS 3D

Set poetry in motion.

By Gary Ludwick

A BLURB ON the package introduces Video Effects 3D as a titling-effects package. Don't jump to the conclusion that this is another title-generating program, though; Video Effects 3D is actually a title-animation program. You cannot create graphics with it, but Video Effects allows you to manipulate titles and artwork in a variety of fascinating ways.

BIG TIME

Video Effects 3D has capabilities that were, until now, mainly the province of expensive television-studio apparatus. With it, you can produce customized three-dimensional effects—including zoom, compress, tumble, turn, spin, flip, and tilt—all while maintaining correct perspectives and relationships.

Video Effects 3D can not only put a drop shadow behind your type; it allows you to define the shadow, its depth, and its relationship to an imaginary fixed or free light source, too. (Under a fixed light source, the shadow maintains a constant relationship with the typeface during animation. Free means the shadow changes as the type moves, in relation to an imaginary light source directly over the viewers head.)For all the moves and gyrations you can define center. If you make B the center point of the word Ball, and then spin it, the word appears ►

to be hinged like a door. Relocating the center point changes the look of the move. For example, if you move the center point to the middle, between a and l, it appears to spin end for end.

Video Effects 3D contains a multitude of features, controls, and possibilities on a non-copy-protected disk. It can create shatter effects, making type appear to break into pieces and fly off the screen. It can also create true three-dimensional extrusion from flat type. Unlike most titling programs which simply make a diagonal stamp of the original letter to create the 3-D effect, Video Effects does it the hard way, pixel by pixel. This feature lets you specify up to three colors for the shaded area for a smooth, realistic look that is faithful to your imaginary light source. Unfortunately, the extrusion function is limited in usefulness. Although the manual recommends using the technique only on type that occupies less than 25% of the screen, I had trouble getting it to work correctly on type at the 20% mark. A frame-check feature does let you know in advance, though, whether the effect will work.

All of these effects are rendered in high resolution, and so must be the art you import. Video Effects 3D works on a palette of two, four, or eight colors. The larger and simpler the areas of color, the smoother the animation will be.

GIVE IT A GO

Once you load your title, the program converts it to an internal form for manipulation. You must then define the parts you want to animate by outlining them in a framer. If you have a three-word title, for example, you can choose to animate any of the words individually, or manipulate the title as a single piece.

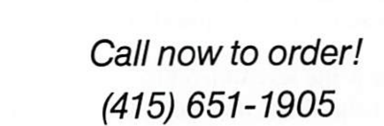
From there, it's off to the Keyframe menu, where you specify the point at which your animation begins (keyframe 1), the place it moves to and its position at the finish (keyframe 2), and how long it remains there (keyframe 3). Using the Edit Keyframe menu, you define every aspect of the moves and effects for each keyframe, as well as the length of each move in real time and in frames.

As you define each element's beginning and ending points through keyframes, Video Effects 3D constructs a script. This visual script works like a tape recording with multiple tracks, each one assigned to an animated element. If you assigned separate moves and effects to each of the three words in the example title, three parallel tracks would show movement in terms of frame count and total duration.

You can preview moves and effects to a certain extent. Moves are shown in wire-frame mode (in the interest of speed), and the frame-check feature allows you to preview any still frame for composition, color and effect. When the script and moves pass initial inspection, it's time to render the individual frames. You define where the animation begins and ends. Then Video Effects steps in and unleashes its power, rendering every intermediate frame. Because it normally works in a 60-frame-per-second mode for smooth effect, your Amiga will spend a lot of time drawing (a three-second effect equals 180 frames). My shortest piece of animation took over 90 minutes to render, and the longest, so far, nearly 25 hours! The time requirement is not a program fault, it's a fact of life. Once the rendering process starts, however, it takes over the machine; you cannot mul- ►

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Circle 107 on Reader Service card.

titask, and a warm boot is your only escape. When rendering is complete at last, selecting the Video Play option displays what the computer hath wrought.

THE GOOD, BAD, AND BEAUTIFUL

Video Effects 3D has one of the best-designed interfaces I have used. There are no pull-down menus and no keyboard commands needed (except at the CLI); it is entirely mouse driven. All work screens, menus, and control panels are in high resolution with almost no trace of flicker, and controls are of the toggle variety. Click on the left side of a button to decrease the value it controls, and on the right side to increase it; keep the button depressed and the value changes continuously.

Even better is the way Video Effects 3D provides help. Every time you place the cursor on a button or control, a panel opens to explain that control's function, and how to use it. The panels are positioned so as not to interfere if you do not need them. This is a useful, elegant solution to a major problem.

If only the documentation were as polished. Not a drawing, screen photo, or diagram is to be seen in the manual, and some of the explanations and directions are vague, wrong, or out of order. There was no registration card for upgrades and no phone number for support.

Perhaps this program's weakest point is its inability to let you preview the total animation. While you can check individual frames and actions, you cannot see how the elements are synchronizing. Once I had to wait 19 hours to find out that my animation wasn't working right! Either a total-animation preview feature should be added, or the manual needs much more detail on how to coordinate effects and script design.

Animation of this calibre takes time. When everything comes together, animation produced by Video Effects 3D is as smooth, fluid, and detailed as any I have seen.

Video Effects 3D
InnoVision Technology
PO Box 743
Hayward, CA 94543
415/538-8355
$199
One megabyte and two drives required.

DR. TERM PROFESSIONAL

Prescribed for the telecommunications pro.

By Sheldon Leemon

DR. TERM PRO is a serious telecommunications package. Its extensive capabilities come at the expense of simplicity, however. While this program is flexible enough to satisfy the expert, it may deliver an overdose to the novice.

Weighing in at over 167K, Dr. Term has most of the standard terminal program features and a good deal more. For example, in addition to the normal communications settings such as speed, parity, and duplex mode, the program offers a full set of filtering options for incoming and outgoing text. On the input side, you can choose to strip control characters, add a carriage return or line feed to each incoming line, or discard carriage returns. On output, it allows you to add line numbers, to translate the end-of-line key as a carriage return, line feed or both, to convert tabs to spaces, and to ►

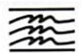
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change lowercase letters to uppercase. It also lets you insert a delay between each character sent, so that slow hosts do not lose characters, or add a space to lines that consist only of a carriage return, for hosts that interpret a blank line as an end-of-file. On both input and output, you can choose to use XON-XOFF handshaking, and you can select from one of three translation tables (including ASCII to EBCDIC).

The program lets you specify a variety of settings, including modem type (Hayes 300, 1200, or 2400), dialing type, time between redials, and S-register settings. Although Dr. Term restricts modem dialing to the almost-universal Hayes command set, it allows manual dialing. You can store modem, I/O filter, and other settings in a configuration file along with up to 40 macro key definitions.

Dr. Term Pro's phone directory holds up to 318 entries. Each entry can store a name, phone number, a settings file to load when the number is dialed, an answerback sequence (used with some old mainframe systems), a message to be displayed when the number is called, and a log-in sequence. Unfortunately, the program requires that you identify each entry by a six-character code limited to numbers and uppercase letters. This restriction can generate confusion when you have a number of similar entries. The program also includes a complement of disk functions that you can perform from within the program. Menus allow you to display a directory and delete, rename, or display a file.

Doctor's Orders

Terminal emulations, one of the program's weak spots, are limited to the DEC VT-52 and a subset of VT-100 functions (80 characters only). The two other "emulation" modes are really nothing more than screen-display modes. (Dr. Term mode displays text in a window, while TTY mode uses a borderless screen.) The program employs the normal Workbench screen in all emulation modes. In any emulation mode, you can use the bottom line of the screen as a status line to display information concerning protocol transfer progress, connect status, and connect time, as well as the time, date, and error messages. In addition to the main display, a chat window is available so that you can prepare and edit text before sending it.

Dr. Term gets only average marks in the area of protocol transfers (these transmissions ensure that program files arrive intact). The program supports a number of the more popular protocols, including XMODEM, WXMODEM, YMODEM, CompuServe B, and Kermit. Its YMODEM implementation does not include batch mode, however, and there is no option for the new "Quick B" variation of CompuServe's protocol. Worst of all, the XMODEM implementation doesn't perform padding stripping. Because XMODEM expands files to fill multiples of 128 bytes, the absence of padding stripping prevents AmigaDOS from executing downloaded programs until they have been pruned with a separate program. Failure to include this capacity is a serious oversight; almost every other Amiga terminal program performs the function automatically.

Patient Rapport

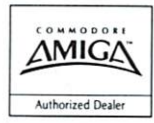
One of Dr. Term's most powerful features is its script language, which you can use to automate on-line sessions. It ►



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operates in a manner similar to AmigaDOS sequence file processing: First you create a file containing commands to the terminal program and text strings to send through the modem. Then, anytime you want to execute that series of commands, you need only tell the program to send the script (you can even define a single macro key combination to execute the script file). Dr. Term's script language provides for up to five numeric or string variables. It includes conditional execution commands (IF. . .THEN. . . ELSE, and ENDIF). It allows parameter substitution, and can execute up to nine levels of nested scripts. You can access any of the program's features from a script file. About the only feature that the script language lacks is the ability to automatically execute commands at a predetermined time. Documentation of the script language is sparse, however. A greater selection of sample scripts would better demonstrate the language's power.

Also impressive is the Remote mode, in which the program becomes a mini BBS, allowing a remote operator to obtain a directory listing of the system's disk drives, and to download or upload files. This is useful for those who want to exchange files between computers. Remote mode allows for password protection so that casual callers cannot get into your system and wreak havoc.

Dr. Term is no general practitioner. It is not easy to use (the capability to record a script file for logging in would be appreciated, for example), and its complex nature and lack of XMODEM padding stripping make it a poor choice for casual BBS browsers. Those who require remote capabilities and flexible text-filtering options, however, may find a visit to the doctor worthwhile.

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GAME SHORTIES

CAPONE

FACING THE two-story house, you notice a head rising up in a window. He's one of the gang. Before he can get a shot off, you aim and fire. Then, a couple of thugs toting machine guns stroll in front of the house. You blast them away, only to find burning sticks of dynamite in their places. More hitmen shoot from the windows, and while you're firing back, you notice that the dynamite fuses are getting dangerously short. You destroy one, but the other explodes before you can get to it. . . you've just lost one of your lives!

Described in documentation as an action adventure, Capone is actually an excellent arcade game. You, a cop armed with a handgun, are involved in a shootout with the entire Capone mob. Except for lapses to load scenery from disk, game play is nonstop. There is no pause button, no haven, no respite.

You can select your skill level (cadet, rookie, or captain) and one- or two-player mode, but more importantly, you have a choice of weapons: the standard mouse or Actionware's light phaser gun ($49.95). With a light pen in the barrel and a lens to focus light from the screen, the gun achieves the effect of shooting characters and objects on the screen—and what a realistic effect it is! Played with the light phaser gun, Capone surpasses any commercial light-gun game I've seen. For concurrent team play on an A500 or A2000, add a dual-gun interface ($39.95) and an extra phaser.

As you play, the screen smoothly pans the street revealing various scenes. One is outside a warehouse, and the next is inside, where gunmen hide behind crates of TNT (one bad shot and the place blows up)! Don't hit the innocent bystanders that occasionally wander by or peer out the windows; you could lose points or even a life. Blasting the machine guns that sometimes appear on the street will gain you 500 points, and for a short while your light gun will turn rapid-fire (unfortunately the mouse is not effected in this way).

Capone's graphics and sound are superb. Play it with a mouse if you must, or find out what 1920s Chicago was really like with the light phaser gun! *($39.95, Actionware, 38 W. 255 Deerpath Rd., Batavia, IL 60510, 312/879-8998, 800/848-2333, 512K required.)*

—Louis Wallace ■



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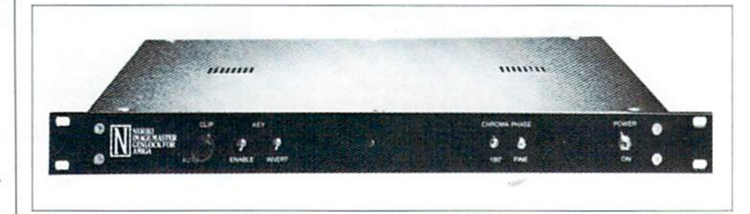
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C MORE

ACCENT YOUR STYLE! Now you can program in dialect with **Lattice C++**, a superset of the C language. Lattice C++ translates C++ language into C source code, which you can compile, using the Lattice AmigaDOS C Compiler, and then link (a driver in the package combines the three operations into a single step). C++ gives you C's flexibility and efficiency, yet allows greater data abstraction and object-oriented programming. Because C++ supports "inheritance," it allows simple objects to be expanded into more complex ones, which in turn can be extended into increasingly-functional objects. Lattice uses the inheritance feature to map the Amiga's data structure, too, and thus it banishes data type casting while retaining data type checking advantages. C++ includes features to help you avoid other common errors in C programming, and enables you to declare variables as statements anywhere in the program. Get the plus for $500 from Lattice Inc., 2500 S. Highland Ave., Lombard, IL 60148, 312/916-1600.

MASTER OF VIDEO

THE **NERIKI IMAGE Master Pro** genlock offers broadcast resolution with encoded capability of 600 lines, and the ability to record in any video format. The unit offers a luminance key, power supply, and a full key-to-background function. It supports all resolutions. The Image Master is $2200. Neriki Computer Graphics' (Spectrum Centre, 200 Pacific Highway, Crows Nest, Sydney, Australia 2065, 02/957-4778) distibutor is Compu_Art, PO Box 712, Victoria Station, Montreal, Quebec H32 2V8, 514/483-2080.



Neriki's Image Master serves video professionals.

UPDATE! UPDATE!

SOME SOFTWARE developers have been spiffing up previous releases. **Express Paint 2.2** offers toggle-on mouse pointer, menu bars, and tool icons. The lasso cut/copy feature for creating irregularly-shaped brushes is another new feature. But the fanciest option is unlimited Undo; with it you can step all the way back to where you started! The package is $99.95. Express Paint 2.0 owners can trade up for $15; 1.0 users for $25.

Metacomco Pascal 2.0 sets you free from ISO-standard constraints with a number of extensions. Among them are separate compilation, random access, and dynamic strings. The package also provides single and double floating-point routines, full 32-bit pointers, and bit-wise integer operations. The new manual includes a chapter to help you convert Turbo Pascal programs to Metacomco. Version 2.0 is $129.95 from the US distributor, Southern Technologies, 3212 Beltline Rd., Suite 301, Dallas, TX 75234, 214/247-7373. Direct from Metacomco, the package is £89.95; the manufacturer handles all upgrades (£38.50), too. Contact Metacomco at 26 Portland Sq., Bristol BS2 8RZ, UK, 0272/428781.

OTG Software has packed symbolic assembly (using Wack-readable symbol information), true text detection, expert system disassembly for improved code detection, and a 55-page manual into **DSM 1.0d**, their MC68000 disassembler package. DSM produces assembly source code output for any executable program that does not use overlays; version 1.0d code is fully compatible with the assem assembler. The program sells for $67.50, but registered owners can get 1.0d for $20. Contact OTG at 200 W. 7th St., Suite 618, Fort Worth, TX 76102, 312/816-3474.

The Guru-gobbling program GOMF is now two packages. **GOMF 3.0** ($34.95) is now compatible with 68000 and 68010 microprocessors. Also, the C00000 memory problems in the A2000 have been fixed. **The GOMF Button** ($69.95), a hardware/software combination, lets you save your data *after* a program crash. This version also thaws the "freeze"; locked-up machines unlock with the push of a button, and your data is rescued. The GOMF Button circuit board installs under the Paula chip in any Amiga, and a small wire ending in a push button protrudes from it. If you own GOMF, you can get the software upgrade for $10 and the Button for $30. Get your GOMFs from Hypertek/Silicon Springs, 205-2571 Shaughnessy St., Port Coquitlam, BC, Canada V3C 3G3, 604/924-4577. ►

Thunder Power

AT THE WHEEL of the Thunder Master, you are the world's last hope. In **Fire & Forget** you must pilot this "ultimate fighting machine" through six conflicts ranging from guerillas to global war. If your high-tech weapons fail you, a second player can activate the Thunder Cloud to protect the Thunder Master. Shoot first and ask the price ($39.95) later. To enlist, contact Titus Corp., 20432 Corisco St., Chatsworth, CA 91311, 818/709-3693.



Lightning strikes from aboard the Thunder Master.

Chairman of the Boards

A PROTOTYPE ZORRO-2 board for your Amiga 2000, the **Protoboard-II** has built-in auto-config layout. The board is capable of holding up to 119 16-pin DIP IC devices. It offers unrestricted component placement, and supports PLCC-type sockets. The board has plated through holes on a .1-inch grid; the first set of 37 holes in the I/O area accepts various DB connectors, and the second set (over 100) accommodates header pins for ribbon-cable interfaces. Protoboard-II comes packaged with a utility disk, adjustable bracket, and mounting hardware. Voltage and ground planes are also provided. Contact Akron Systems Development, PO Box 6408, Beaumont, TX 77705, 409/833-2686.

PostScript Pro

LASER YOUR LETTERS at a low cost with **ProScript**. A companion program to ProWrite (both are from New Horizons Software), ProScript translates the word processor's files into PostScript for you to send to a PostScript-compatible laser printer or to save to disk. You can reduce or enlarge the printout, choose the paper size, print odd or even pages only, and control the number of gray shades the program uses to convert ProWrite's color graphics. It will print mail-merged documents, too. ProWrite and PostScript fonts are both at your disposal. The program retails for $49.95. Direct your questions to New Horizons Software, PO Box 43167, Austin, TX 78745, 512/328-6650. ►

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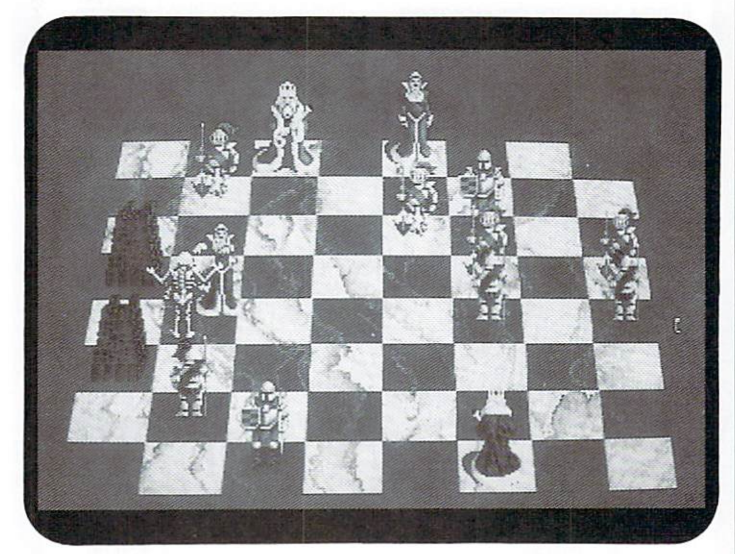
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A Dark and Stormy Knight

THE DESTINY WAND maintained peace and prosperity in the Realm for 700 years. Then mercenaries stole it, broke it into seven fragments, and hid them. Now you must assemble a crew of adventurers to find the pieces and restore the wand. **The Bard's Tale II: The Destiny Knight** offers six new cities and 25 dungeon levels to explore. Enemies can be as close as ten feet or as far away as 90, so weapons knowledge is essential. A wandering sage posesses knowledge you'll need, and advanced magic systems are at your disposal. A clue book, $12.95, can save you should you get stuck. Designed by Interplay Productions, the fantasy adventure ($59.95) is distributed by Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171.

Reason to Fight

NO LONGER IS chess merely a sedate game of logic. **Battle Chess** brings your game pieces to life! Each three-dimensional piece has its own method of attacking; when your armor-clad knight takes the opponent's pawn, you can watch as he strides forth, and slays the footsoldier. Sit down with a friend to play, or hook up via modem. You can also challenge the computer, or let the computer oppose itself. Battle your way through ten levels for $49.95. The game, by Interplay, is distributed by Mediagenic, 3885 Bohannon Dr., Menlo Park, CA 94025, 415/329-0800.


An age-old board game turns to life-or-death combat in Battle Chess.

Horror and Humor

FIRST ROW SOFTWARE brings two TV classics to the Amiga with **The Twilight Zone** and **Jackie Gleason's The Honeymooners**. When you enter The Twilight Zone, a graphic text adventure, you enter an eerie and bizzare story. Watch out for a twist at the end. A role-playing game, The Honeymooners lets you try to out shout the irrepressible Ralph Kramden. Both games sell for $39.95. Consult the listings at First Row Software, 900 East 8th Ave., Suite 300, King of Prussia, PA 19406, 215/337-1500. ■

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HELP KEY

At the witching hour, Lou exorcises your computer demons, narrowly making his deadline.

By Louis R. Wallace

Graphic Reflections

Q: *I need to use my Amiga to create graphics, then convert them to IBM format. Is there any commercial or public-domain package available to do it for me?*

R. Savryk
Arroyo Grande, CA

A: Reflection ($89) by International Microcomputer Software Inc. allows you to convert pictures among the Amiga, IBM PC, and Macintosh. The Amiga source files must be at most 16 colors—any extra colors are ignored. The software runs on the IBM only, so you must transfer the Amiga files to the PC via a modem or a null cable. If your Amiga is equipped with a Bridgeboard or A1010 5¼-inch drive, you can transfer the files via software. Reflection lets you choose the PC graphics format you wish to convert to. Possible formats are Dr. HALO, PC Paintbrush, TIFF, InSet, the Hewlett-Packard LaserJet's .HPC format, or PostScript. For more information, contact International Microcomputer Software Inc., 1299 Fourth St., San Rafael, CA 94901, 415/454-7101.

Chip Shots

Q: *If I am satisfied with my Amiga 500 as it is, why should I bother upgrading it with the new graphics chips that support additional chip RAM? Will future software require the new chips, or will it work with both old and new? If I do get these chips, will I need to expand my A500 beyond 512K to use them? Will older Amiga software still work with these chips?*

E. Bolog
Sterling, VA

A: As of this writing, those chips have not been released to the public, and only a few developers have them. I don't have any hands-on experience with the chips, but I will make some educated guesses.

If you are happy with the current chips, you don't need the new ones. Because many Amiga users will never upgrade to the new chip set, most software developers will support both chip sets. As with any format change, the new chips will not be compatible with some existing software. Of course, some programs will be developed that require more than 512K of chip RAM and, as a result, require the new chips. Because you cannot use one megabyte of chip RAM on a machine with only 512K, you will need more than 512K to use the chips. On the plus side, with the new chips, and increased chip RAM, you can multitask more graphics- and sound-intensive programs.

In Print On Printing

Q: *Before I invest a lot of money in desktop-publishing software and hardware I want learn about the subject. Can you suggest some good books on desktop publishing?*

F. Goldsmith
Canton, OH

A: Looking in my library, I came up with two books I can recommend. While not Amiga specific, they are packed with useful information on designing and creating professional looking documents. Try to find *The Illustrated Handbook of Desktop Publishing and TypeSetting* by Michael L. Kleper ($29.95, published by TAB Professional And Reference Books, 717/794-2191) and *Design for Desktop Publishing* by John Miles ($16.95, published by Chronicle Books, 415/777-7240).

Get Started

Q: *I want to automatically execute an Amiga Basic program called BOOTUP.HANDLER on startup, but when I inserted the command*

SYS:BOOTUP.HANDLER

into my startup-sequence, I got an AmigaDOS error message that said "Unable to Load File SYS: BOOTUP.HANDLER : file is not an object module." By experimenting, I determined the problem was that Amiga Basic programs are projects, not tools. Can I run Amiga Basic programs directly from the CLI, and if so, how?

J. Luk
San Francisco, CA

A: You are quite correct. You cannot directly execute Amiga Basic programs from CLI batch files, such as your startup-sequence, but you can automatically load and run Amiga Basic programs. To your startup-sequence add the statement:

```
AMIGABASIC
BOOTUP.HANDLER
```

This will execute Amiga Basic, which then loads and runs your program. If you want the Amiga Basic program to run as a task, insert the AmigaDOS command RUN at the beginning of the line. A more costly solution is to buy Absoft's Amiga Basic Compiler, which will generate stand-alone programs. Contact Absoft at 2781 Bond St., Auburn Hills, MI 48057, 313/853-0050.

Out Back In The BBS

Q: *I want to set up a BBS on my Amiga 2000 and have it operate in the background. Is this possible? If so, where I can get the software to do this?*

J. Flugan
Yuma, AZ

A: BBS-PC! ($99.95) is a very sophisticated bulletin board system. The software will multitask, and you can run it in the background while you use the computer for other work. For all the details on BBS-PC!, contact Micro-Systems Software, 12798 Forest Hill Blvd., West Palm Beach, FL 33414, 407/790-0770. ■

Comspec Allows Gigabytes for Amiga Computers

Comspec is pleased to announce the release of it's new Bernoulli System for the Commodore-Amiga Personal Computers. The Comspec Bernoulli Box allows users unlimited storage, portability, unbeatable security and ease of backup all in one. Up until now only MS DOS users have had access to this advanced and much sought after technology.

A Revolutionary Technology

Of course, the Comspec Bernoulli System wasn't born in a day. It followed the dazzling success of the original Bernoulli System which is currently in use with over 200,000 users.

At the heart of every Comspec Bernoulli System is the remarkable Bernoulli Technology. Head crashes or disk contamination are virtually impossible. Data is accessed and transferred at a rate matching or surpassing that of hard disks. The end result is a high-performance mass storage system with built-in backup that is rugged and decreases in cost as you increase capacity.

What is a Comspec Bernoulli System ?

A Comspec Bernoulli System is a storage device that works similarly to a fixed hard drive, with the convenience of a floppy drive, and at the same time offering several key advantages over both. The Comspec Bernoulli box uses 20 megabyte removable cartridges., This allows the user to have virtually unlimited storage capability. As your data needs grow, you can add inexpensive cartridges instead of expensive hardware. That equals hard disk convenience without hard disk limitations or long term costs. Since the cartridges are removable, each person can have their own cartridges, and you will not need to invest in an expensive network. As the cartridges are very compact (5.43 in.L x 5.35 in.W x 0.35 in.H), they can be given to the person down the hall, across town, or around the world, without the normal concern about transporting media.

Advantages Over Competitive Bernoulli Systems

Comspec's Bernoulli System has an important feature called **disk change management.** Whenever the user inserts or removes a Bernoulli cartridge the Amiga operation system is automatically informed, and its icon will appear or disappear, the same way a floppy icon will. This is a very important benefit to the user. The Amiga Operating System knows which disk is in which floppy. Requesters and icons automatically appear or disappear as required. Comspec has designed it's Bernoulli System to operate identically to that of the Amiga's floppy drives.

In some competitive products, you must run a program to initialize the system each and every time you remove a cartridge. This is not only a time consuming and tedious exercise, but if you forget, the Amiga operating system will get confused and will end up corrupting your data and could even crash the entire system. With the Comspec system this can never happen.

Another major feature of the Comspec Bernoulli System is the ability of "auto booting" under Kickstart and Workbench V1.2 or the new V1.3 version on an Amiga 1000 computer, and V1.3 on the Amiga 500 and 2000..

Simply insert a previously configured Bernoulli cartridge and the Amiga can auto boot. No other Bernoulli system currently available for the Amiga can make that claim. Similarly, the Comspec Bernoulli System also supports the (FFS) FAST FILE SYSTEM. Comspec Bernoulli System owners can now take advantage of increased performance and unlimited storage capability even if they already own a hard drive for the Amiga.

Although there are competitive products available, none offers as complete a system as Comspec. In fact, some competitors even expect you to purchase a SCSI interface from a separate supplier, and then try to figure out how they are going to work together. Comspec not only supplies memory expansion, hard drives and interfaces, but supplies the Bernoulli System as a complete ready-to-run package.

With the Comspec Bernoulli System, you get all the advantages of the highly acclaimed Comspec Hard Drive System, such as media defect management, low processor overhead, partitioning ability, easy expandability, and proven reliability.

Is the Comspec Bernoulli System for You?

Who can benefit from using the Bernoulli System? Anyone who has vital data to be safeguarded or shared. If you need to store large amounts of data, deal with multiple data bases or lengthy files, share that data with others, or if you need to keep it completely secure, then the Bernoulli System is for you.

Defense contractors use Bernoulli Cartridges for storing and securing top-secret information. It is not uncommon for artists, animators, and programmers to generate program code that is 2 or 3 megabytes in size. Until now they have always had problems transferring their data to others, now they can store their data on Bernoulli cartridges, and have the convenience of sending their data to anyone else who has a Comspec Bernoulli System. Architects, Advertising agencies and Lawyers can store client files on individual cartridges to provide electronic client history files. All this with the same convenience as a floppy!

Comspec Bernoulli System Configurations

The Comspec Bernoulli System comes in many different configurations, but all configurations must include a Comspec SCSI host adapter for your particular Amiga.

For the Amiga 500 & 1000 you can purchase a Comspec Bernoulli System in two types of housing. The SD chassis housing allows room for up to two 5.25" in. devices. This would allow installation of up to two Bernoulli Systems or one Bernoulli System and another device such as a Comspec hard drive.

The second type of housing is the low profile "SSD" Amiga 500 chassis housing which has room for one 5.25" device and one 3.5" device. The "SSD" chassis also doubles as a monitor stand when connected to the Amiga 500. A typical configuration would be a Comspec 3.5" hard drive and a Comspec Bernoulli System.

Although the Amiga 2000 has the same options as above, it can also have a single Bernoulli System installed inside the Amiga 2000 where the 5.25 floppy drive for the bridgecard would normally reside.

Technical Information

Physical Size

Amiga 2000 Internal Bernoulli System

Length	8.0 in.
Width	5.75 in.
Height	1.625 in.
Weight	3.9 lb.

Performance

Seek Time Including Settling

Single Track	6 ms.
Average	40 ms.
Maximum	78 ms.

MODELS AVAILABLE

B20* - Internal Bernoulli System for Amiga 2000 and, for owners of Comspec SD 20/40/60 hard drives

SD-B20* - External Bernoulli System for Amiga 1000/2000 (SD chassis allows room for an additional 5.25" device)

SSD-B20* - External Bernoulli System for Amiga 500 (SSD chassis allows room for an additional 3.5" device)

* Please note the Comspec SA 500, SA 1000, and SA 2000 SCSI interfaces are required for the above and are sold seperately.

COMSPEC B20 DRIVE STARTING AT $1625.00 U.S.
COMSPEC SCSI INTERFACES FROM $249.00 U.S.
(The above is an internal system for the Amiga 2000)

Additional configurations are available, please contact your dealer, or Comspec directly at the address listed below.

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*Specifications subject to change without notice.

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The Pull-Down Menu

The Pull-Down Menu

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Hole-In-One Miniature Golf

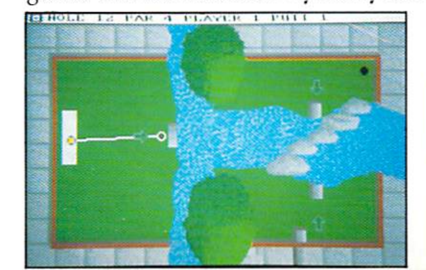
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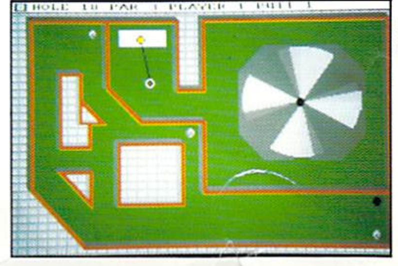
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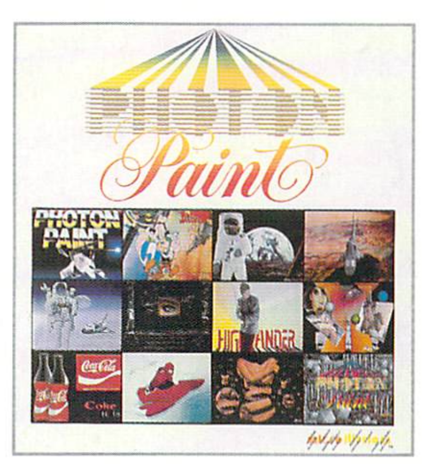


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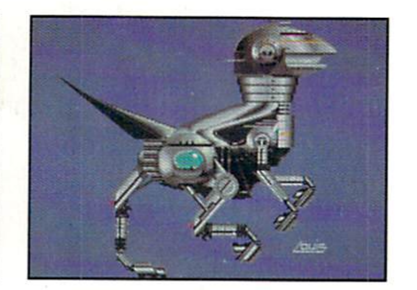


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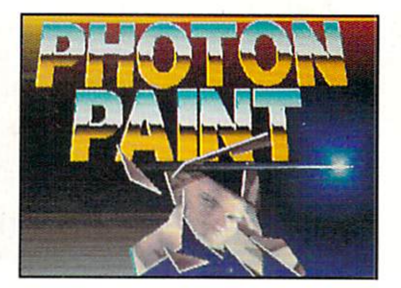














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